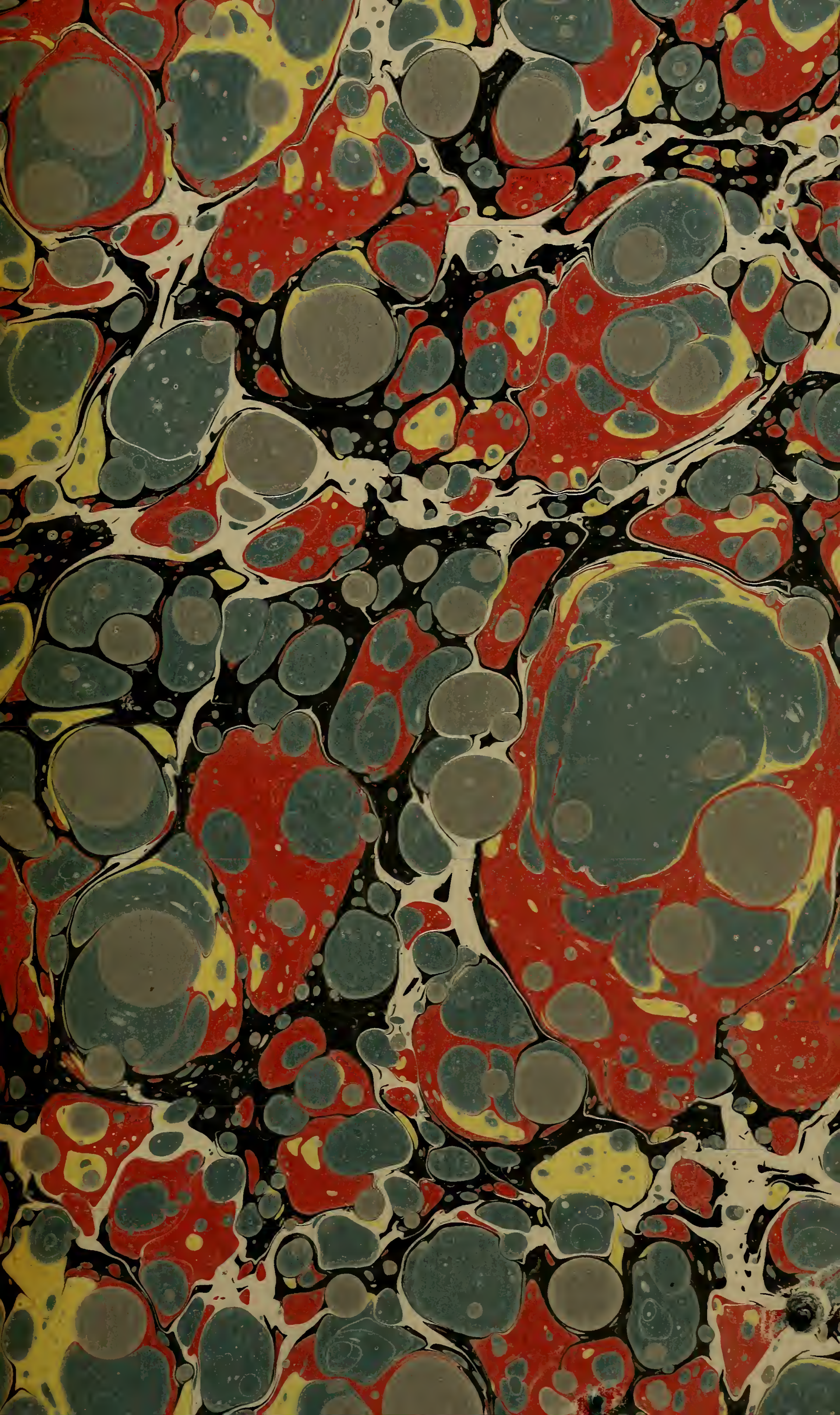

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PAPERS

ON

AGRICULTURE,

CONSISTING OF

COMMUNICATIONS

MADE TO THE

MASSACHUSETTS SOCIETY FOR PROMOTING AGRICULTURE.

PUBLISHED BY ORDER OF THE TRUSTEES.

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PREMIUMS

Offered by the TRUSTEES *of the* MASSACHUSETTS SOCIETY *for* PROMOTING AGRICULTURE.

1ſt. TO the perſon who ſhall diſcover an effectual and cheap method of deſtroying the Canker-worm, and give evidence thereof, to the ſatisfaction of the Truſtees, on or before the 1ſt day of October, 1803, a premium of *one hundred dollars*, or the Society's gold medal.

2d. AND a premium of *one hundred dollars*, or the Society's gold medal, to the perſon who ſhall, on or before the 1ſt day of December, 1803, diſcover an effectual, and the cheapeſt method of deſtroying the Slug-worm, and give evidence thereof to the ſatisfaction of the Truſtees.

3d. AN annual premium of *thirty dollars* for each year, previous to 1805, to the perſon who ſhall introduce into the ſtate of Maſſachuſetts a ram or ewe for the purpoſe of propagating a breed of ſheep ſuperior to any in the ſtate at the time they are ſo introduced. If from a foreign country *fifty dollars.* Claims to be preſented on or before the 1ſt of October, annually.

4th. To the perſon who ſhall produce the largeſt quantity of wool, meat and tallow, from the ſmalleſt number of ſheep, not leſs than one ſcore, raiſed on his own farm, a premium of *thirty dollars* ; to be claimed on or before the 1ſt day of Auguſt, 1804.

5th. To the perſon who ſhall, in one year, by a method new and uſeful, or that ſhall be an improvement on the methods already practiſed, make the greateſt quantity of compoſt manure in proportion to the expenſe ; to be of a good quality, and compoſed of materials common to moſt farms ; the quantity to be at leaſt two hundred tons ; and the claim to be accompanied with a deſcription of the yard or place, and the mode in which the ſame is made ; a premium of *fifty dollars*, or the Society's gold medal. And for the next greateſt quantity, being not leſs than one hundred tons, *thirty dollars.* Claims to be preſented previous to the 1ſt of Auguſt, 1803.

6th. To the perſon who ſhall ſhew by actual experiment, on not leſs than two acres, to the ſatisfaction of the Truſtees, a new or improved

proved, being the beſt and cheapeſt method, of introducing fine graſs, fit for hay or paſture, into low freſh meadows, now producing coarſe wild graſs, or buſhes, a premium of *thirty dollars.* Claims to be preſented before the 1ſt of November, 1804.

7th. To the perſon who ſhall diſcover any ſpecies of graſs, not commonly cultivated or known, of a quality for the food of neat cattle or horſes, equal or ſuperior to thoſe now in uſe, *fifty dollars.* Claims to be preſented on or before the 1ſt of October, 1804.

8th. To the perſon who ſhall exhibit diſtinct ſpecimens of greateſt variety of graſſes in general uſe, and ſpecify, to the ſ the faction of the Truſtees, their reſpective qualities, productiveneſs atis- uſefulneſs as food for different kinds of animals, a premium of and *dollars* ; to be claimed on or before the 1ſt of October, 1803. *fifty*

9th. To the perſon who ſhall produce, from ſeed, the beſt growth of thrifty trees, not leſs than 600 in the whole, and in the proportion of 2400 to the acre, of any of the following kinds of foreſt trees, *viz.* oak, aſh, elm, ſugar maple, beech, black or yellow birch, cheſnut, walnut or hickory, *twenty-five dollars* ; if all of oak, *fifty dollars.* Claims to be made on or before the 1ſt October, 1806.

10th. To the perſon who ſhall aſcertain, by accurate analyſis, the conſtituent parts of ſeveral fertile ſoils reſpectively, and in like manner the parts of ſeveral poor ſoils, and thus ſhall diſcover the defects of the latter ; and ſhall ſhow, by actual experiments, how the ſaid defects may be remedied by the addition of earths or other ingredients, which abound in the country, and in a manner that may be practiſed by common farmers, *fifty dollars.* And if it ſhall appear, to the ſatisfaction of the Truſtees, that, upon an extenſive practice, the improvement of the poor ſoil would be more than equivalent to the expenſe of the improvement, the addition of *one hundred dollars.* A minute deſcription of the ſeveral ſoils, and all the circumſtances attending the proceſſes, cultivation and reſults, will be required. Claims to be made on or before November, 1804.

11th. It is required that the Communications, for which the foregoing premiums are offered, be accompanied with proper certificates from the Selectmen, Magiſtrates or Clergymen of the vicinity, or other vouchers, to the ſatisfaction of the Truſtees ; that they be delivered in without names, or any intimation to whom they belong ; that they be ſeverally marked in ſuch manner as each claimant ſhall think fit ; the claimant ſending alſo a paper, ſealed up, having on the outſide a correſponding mark, and on the inſide his name and addreſs.

By order of the Truſtees.

JOHN AVERY, Secretary.

AGRICULTURE.

OF THE BENEFIT OF STRIPPING THE BARK FROM THE TRUNKS OF TREES, &c.

By a Member of the Kennebec Agricultural Society.

Of the benefit of ſtripping the bark from the trunk of certain diſeaſed or feeble orchard trees; confirmed by accounts reſpecting the periodical diſbarking of the Spaniſh cork-trees; and of certain other operations which may be performed with advantage on the bark of fruit trees.

IN the very valuable Medical Repoſitory, publiſhed at *New-York*, by Dr. S. L. MITCHILL and Dr. EDWARD MILLER, an article is inſerted, (vol. 3, p. 420.) with the initials of the firſt of theſe ingenious and learned editors, reſpecting the regeneration of the bark of apple trees. This writer deprived the whole body of one of his apple trees of its bark, in the ſummer of 1799, without injury to its leaves or fruit; and in *two months* an entire new-coat of bark was formed, ſurrounding the wood on every ſide. The able relater of this fact, notwithſtanding the natural intrepidity of his mind and the extent of his information, ſays, that though he has "ſeveral times been witneſs of the harmleſsneſs of the practice, it looked to him ſtill like a very violent and hazardous remedy."

A ſimilar ſurpriſe prevailed near a century ago, among ſome of the members of the *Royal Academy of*

Sciences at Paris, in conſequence of an elm having, during a ſingle ſeaſon, ſurvived the loſs of the bark belonging to its trunk. The following is the account of this incident, given in the hiſtorical part of the tranſactions of this learned body for the year 1709, by its ſecretary M. DE FONTENELLE : "An elm in the Tuilleries [a royal garden at *Paris*,] which, in the beginning of the ſpring of 1708, was entirely without its bark *from its root up to the branches*, continued to circulate its ſap in every part, and maintained itſelf in leaf through the whole of the following ſummer ; though it had leſs appearance of vigor than the other elms around it. M. DU PUIS, the firſt gardener of the Tuilleries, had the tree taken up in the autumn, from a perſuaſion that it could not be preſerved. It was unfortunate that the experiment was not of longer continuance. M. PARENT ſhewed to the academy an atteſtation of M. DU PUIS on this ſubject ; which the caſe *certainly well deſerved ;* for hitherto it had been ſuppoſed that the bark was much more neceſſary to the life of trees.†"

In the year 1738, the celebrated Count BUFFON informed the ſame learned body, of the fate of various trees, whoſe ſtems he had diſbarked for particular purpoſes. It appears, that many of theſe trees died in the firſt or ſecond year, and that none lived beyond the third and fourth. He ſays, that he was not without ſucceſs in ſome of his efforts to *reſtore* the bark of trees, when removed by accidents ; but he declines all detail of his methods, as being foreign to his general ſubject. He ſtates, however, other experiments, connected with the topics of his memoir, which were performed on the bark of fruit-trees ; which ſhall be recited in their place. ‡

M. DU HAMEL (DU MONCEAU,) another very eminent member of the ſame French Academy, affirms, that he had ſtripped certain trees of their bark; and that having taken meaſures to aid the *reproduction* of this bark, the trees were ſtill living at the diſtance of 15 or 18 years from the time of his writing. He relates this briefly, in the year 1764, in his work on the *Exploitation des Bois*; † and refers to another celebrated work (his *Phyſique des Arbres*) for the firſt mention of this circumſtance; a work, which, unfortunately, I have not at hand.

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† See p 50 of the *Hiſtorical Articles*, prefixed to the Memoirs of the Academy of Sciences for 1709.

‡ See Memoirs of the Royal Academy of Sciences for 1738 ; p. 169, 184.

M. Senebier, of *Geneva*, who undertook that portion of the French Encyclopédié Methodique, which regards the *Phyſiologie Vegetàle*, (which portion was publiſhed in 1791,) ſays, under the article *Ecorce*, that, "if the bark of a cherry tree be removed, and the tree be kept from the action of air, both the bark and epidemis will be reproduced." He affirms, alſo, that "if the whole *epidemis* be taken away, [leaving the reſt of the bark,] it will reproduce itſelf by exfoliation."

Among all theſe great men, in *Europe*, not a word ſeems to be ſaid of applying the removal of the bark to *any uſe* in favour of *the tree from which it is taken*. It appears, even, that few of them have aſcertained that any trees would permanently ſurvive the axtenſive operation of having the bark flayed from the whole of their trunks.

M. Senebier, in particular, thus expatiates on the uſes of the bark.—"The bark ſeems to be the *ſoul* of the plant. It contains an apparatus of veſſels, or the means of nouriſhing and keeping it alive. Trees which have loſt their bark, often periſh, and always languiſh, till they have reſumed it. There exiſts in the bark all the reproductive powers of the plant; all the elements of *ſtems and of branches*.‡ Wounds made in trees only cloſe by means of the bark. It is from the bark of all cuttings that their roots firſt proceed. The ſhoots of plants have their origin favoured by knots in the bark. It is in the bark that juices are elaborated, and that a crowd of ſecretions are performed. It is the bark which produces the wood." "It is the bark which prevents the drying of the ſap-wood."—After all theſe fine things ſaid of the bark, how ſhall we explain the circumſtances related in the ſequel of this paper?

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† Vol. I, book 3. Chap. 6, p. 410.

‡ He refers here to the operation of *budding* (or inoculating.)

The "very violent and hazardous remedy" alluded to by the celebrated S. L. M. has not uncommonly been applied of late years, in certain orchards, in ſeveral parts of *New-England.*

It is true, that this remedy occaſionally fails, either from defect of care in the operator, from too great weakneſs, or the want of a ſufficient age in the tree, from a wrong ſeaſon, or unfavourable weather, being choſen for the operation, or from ſome other cauſe yet unknown to us. But, in ſeveral inſtances, whole orchards have been thus treated with apparent ſafety to the trees and ſatisfaction to the proprietor.—I have myſelf ſeen a young apple tree in the town of *Hallowell*, which, on account of ſome defect, was ſtripped of its bark, about ten years ſince, in the longeſt day of June; and which ſtill lives and bears fruit. Two other apple-trees, in the ſame orchard, underwent the ſame treatment, about the ſame period; but this tree more particularly attracted my notice, on account of *marks left in the new bark*, in conſequence of the finger having paſſed along the ſlime covering the ſap-wood, after the removal of the original bark. The new bark on all theſe trees is remarkably ſmooth, and reſembles the bark on very youthful plants.

The *New-England* farmers, however, have not the ſole merit of *originality* on this ſubject.—The note ſigned S. L. M. above mentioned, has produced another note, ſigned *Cantabrigienſis*; in page 103 of the fourth volume of the ſame excellent Medical Repoſitory. From this ſecond communication we learn, that in the

Miſcellanea Berolinenſia for 1727,‡ there is a paper ſigned I. L. Frisch, concerning the total removal of the bark from the *trunk* of various fruit-trees; to which are added certain *rules* to be obſerved in order to ſecure the production of a new bark.

The following is the abridgment of this account, which is in Latin.

M. de Huneken, of *Carpzow*, (in the Pruſſian dominions;) a friend to improvements, communicated to Mr. Frisch, the author of the paper in queſtion, a method of renewing the bark of fruit trees, practiſed in his large and fine orchard. If any of his apple or pear-trees had a rough bark, or if any cherry-tree was troubled with gum or knots, or if any other cauſe even of ſuſpicion aroſe as to the future fertility of the tree from an imperfection in the bark, M. de Huneken cauſed the entire bark of the trunk to be taken away from the place where the lower limbs ſpread themſelves out, down to the entrance of the trunk into the ground. He was not content with diſplacing the outer and harder bark, but removed even the inner and more tender one; uniformly laying bare the white ſap-wood (the alburnum ;) and deſtroying, for this purpoſe, the fine green fibres within. The author, (like our reſpectable S. L. M.) was aſtoniſhed at ſuch particulars. But M. de Huneken having afterwards ſhewn to Mr. Frisch many trees *newly* ſtripped of their bark, and others with their bark *recently renewed*, he became convinced experimentally of a fact, which, he ſays, was not only new to himſelf, but probably had never before been heard of by thoſe, to whom he addreſſed his paper." This happened about three quarters of a century ago.

It was with the permiſſion of M. de Huneken, that Mr. Frisch ſubjoined to his narrative the *rules* which had been obſerved for conducting the proceſs in queſtion; of which the following is the ſubſtance: 1ſt.

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‡ Vol. 3, p. 26 28. The firſt volume of the Berlin Miſcellanies was publiſhed in 1710. This work contains pieces preſented to the Royal Society of Berlin, of which the famous Leibnitz was the firſt preſident.

The time of the ſummer ſolſtice (or of the longeſt days) is to be uſed, when the ſap is particularly liquid and abundant; paying attention only to the poſition of the trees; which, from being more or leſs expoſed to the ſun, may have their ſap more or leſs advanced for the ſeaſon. 2d. The operation muſt be made complete; for if any of the old bark ſhould be left behind, it would deform the tree by its mixture with the new bark. 3d. A goose's feather muſt be employed to ſpread about the ſap from the parts where it is ſtagnant, to the parts which are dry. 4th. To prevent the heat of the ſun from affecting the running of the ſap, the naked trunk muſt be ſhaded (eſpecially to the ſouth) by cloths, mats, or ſuch other articles as preſent themſelves; and ſimilar care muſt be uſed to keep off winds producing *duſt* of any kind. 5th. And laſtly, the new and tender bark muſt on no account be diſturbed by being handled, ſince the ſlighteſt friction will injure it.

Theſe hints, (ſays the author,) may be uſeful in the *arts*; and eſpecially ſo to the proprietors of trees, of which the bark is called for on ſuch occaſions.

So far Mr. FRISCH—he gives no account of the progreſs of the appearances, ſucceſſively aſſumed by the bark, both as to texture and as to colour; which is ſaid to be different in different trees; and which ought to be noted in a regiſter, with other particulars. Yet from this relation, even in its preſent form, new ideas will readily occur to a ſerious experimenter; and no country is better ſuited to theſe experiments, than one in which the common woods are ſo abundant, and orchards ſo univerſal: I ſay, common woods, for there ſeems no reaſon for confining our experiments ſolely to valuable fruit trees.—Let us, for our encouragement, view ſome accounts of the *cork-tree*.

The tree, on which the bark called *cork* is found, admits, as we ſhall ſoon learn, of this part being cut off *periodically*, during a long courſe of time.

The cork-bark (ſays M. BOMARE,) ſplits of itſelf, and will even ſeparate from the tree without aſſiſtance; being preſſed and driven off by the circular growth of the tree within; that is, by another bark formed under it, which is red, and which may be diſcovered at a conſiderable diſtance. When the inhabitants wiſh to gather their firſt crop of cork-bark, [which is produced by trees from 12 to 15 years old,] they wait for *hot and fair weather*; for if it ſhould rain immediately afterwards, the young bark underneath would ſoon be ſpoiled, and the tree itſelf be in danger of periſhing. The weather then being favourable, they make cuts on the tree lengthways, in order the better to handle the bark. They do not perform a ſecond operation, till after an interval of 6 or 8 years; but thenceforward they repeat it, at like intervals, during a courſe of a *century and a half*, without finding that this frequent ſucceſſive removal of the bark cauſes any inconvenience to the tree. On the contrary, the bark of old trees is the beſt; nor indeed does it become very good, till after the third gathering." [See BOMARE's *Dictionnaire Raiſonne D'Hiſtoire Naturelle*; article *Liege Suber.*]

" When the cork-trees [ſays *Mr.* TOWNSEND,] are fifteen years old, they begin to be productive; yet not for the market; this maiden bark being only fit for fuel. At the end of 8 years more, the bark improves; but does not arrive at its perfection till the third period; after which, for 150 years, it yields a marketable commodity every ten years. The ſeaſon for barking is in July or Auguſt, when they take ſpecial care not to wound the inner bark! [See *a Journey through Spain*, by the Rev. JOSEPH TOWNSEND, Vol I. p. 91, 92.]

Baron (John Talbot) DILLON aſſerts, that the country about Monaſterio [which is ſeventy miles north of Seville, in Spain,] " abounds with a great many cork-trees, from which they ſtrip off the bark every four years, as far as the white ſap [the alburnum,] which they leave on the tree. A liquid humor afterwards iſſues out again, (he adds,) which thickens with the ſun and air, and forms a new bark in about four years more."—But the Baron's uſual guide, Mr. BOWLES, according to his own ſtatement, affirms, "that every four years they peel off the bark *as far as the epidemis.*" Whether we are to underſtand that this *epidemis* is the outer-ſide of the *new* bark ſpoken of by Mr. Bomare, or that the word epidemis is here employed by miſtake; ſtill we learn, that a bark was removed periodically.—Perhaps theſe periods differ in different places, and perhaps there may be different kinds of the cork-tree.—See *Travels through Spain*, by Baron DILLON, 4to. ſecond edition, p. 304.

MILLER, in his *abridged Dictionary*, aſſerts, that there are two or three varieties of the cork-tree; all which, with columella, the Linnæan ſchool, and other authorities, he ranges under the *oak* (quercus.) His account is as follows, and it will be the laſt cited here: "The exterior bark of the quercus ſuper] is the *cork.* This is taken from the trees every eight or ten years; but there is an *interior* bark which nouriſhes the trees; ſo that the ſtripping of the *outer* [bark] is ſo far from injuring them, that it is *neceſſary to continue the trees*; for thoſe, whoſe bark is not taken off, ſeldom laſt longer than fifty or ſixty years in health; whereas, the trees which are barked every eight or ten years, will live one hundred and fifty years or more. The bark of the young trees is porous and good for little: However, it is neceſſary to take it off, when the trees are twelve or fifteen years old; without which the bark will not be good; and after eight or ten years the bark will be fit to take off again. But this ſecond peeling is of little uſe; but [in] the third peeling, the bark will be in perfection; and will continue ſo for many years; for the beſt cork is taken from the old trees.—The *time of year* for ſtripping off this bark is in July, *when the ſecond ſap flows plentifully.*—This is performed with an inſtrument,

ſtrument, like that uſed for diſbarking oaks." (See his article *Quercus.*)

But enough for the preſent of theſe accounts of the cork-tree.

It may even be thought, that ſtatements concerning a tree ſuppoſed to have a double bark, will as little apply to trees with a ſingle bark, as concluſions reſpecting ſerpents, which habitually ſhed their ſkins every year, will anſwer for other animals to whom this faculty is denied.

But, in effect, we are not ſure that what happens to the cork-tree, may not happen, in an inferior degree at leaſt, to ſome other trees.—The ſeaſon, alſo, choſen for operating upon the cork-tree, ſeems to mark at leaſt *one* ſeaſon for attempting the ſame proceſs with other trees. This ſeaſon is the one in which the ſap is conceived to be in its ſecond *flow*, and prepared to form what is called the *mid-ſummer ſhoot* in various trees.—We may be encouraged alſo from the example of what occurs to the cork-tree, to endeavor, in certain caſes, to *renew* the great operation in queſtion upon other trees upon which it has *already been once performed.* In the caſe of the cork-tree, we are told, that the repetition of this proceſs is even friendly to the durability of the tree.

We know that certain *other* barks which are applied to ſpecial purpoſes, (as the bark of the *oak* tree, which is uſed in tanning, thoſe of the *lime* and *mulberry* trees, which ſerve for making ropes for wells, ‡ and that of the American *hemlock fir*, which yields materials for tanning and for fuel ;) we know, I ſay, that theſe barks are generally collected in May and June. But this ſeaſon of May and June has hitherto been choſen ſolely with a view to the eaſe of ſeparating the *bark*, in the caſes laſt mentioned ; and without any deſign of ſeeking to preſerve the *trees* ; which, on the contrary, are left for the axe, and applied to immediate uſe as fuel or timber.

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‡ See M. DUHAMEL's Treatiſe *De l'Exploitation des bois.* Vol. I, p. 222. The European lime-tree reſembles the baſs (or baſs-wood) tree of New-England.

There ſeem indeed to have been few trees among the weſtern nations of the world, beſides the cork, the apple, the pear, and the cherry, which, according to the preſent imperfect notions even of the beſt informed, are held capable of permanently ſurviving this operation.

We may even obſerve, that whatever hitherto has been practiſed reſpecting the bark, by thoſe who have deſigned to preſerve their trees, has been upon a diminutive ſcale.—Of this deſcription, is the longitudinal ſlitting of the bark of a tree which is ſaid to be hide-bound; cutting off the edges of bark which has been wounded; taking out a piece of bark which has been injured, from any cauſe, in order to fill up the vacancy with another piece of like bark which is found and likely to unite with the reſt ‡; covering the bark or wood with ſome ſort of compoſt; treating the bark, like a living patient, with medical drugs; or rubbing it with bruſhes, which are ſometimes wetted.

From our cenſure of neglect upon this occaſion, it is, however, neceſſary to except Count BUFFON; who has made ſeveral experiments upon the bark of *fruit-trees*; of which the chief are ſtill occaſionally ſpoken of by ſpeculative gardeners, though it is not, perhaps, known to all of them that they have M. BUFFON for their author.—We ſhall recite the principal particulars of his account.

M. BUFFON having undertaken, (with the patronage of the French government,) a courſe of experiments upon *foreſt* trees, with a view to perfect their timber, turned his attention, for a moment, to *fruit* trees; being led thereto by certain analogies in the purſuit which was before him.

He removed, from ſome fruit-trees, a horizontal girdle or zone of the bark, of the breadth of three inches, beginning at the height of three feet from the ground.

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‡ The new piece of bark muſt be applied to the wound in the ſame poſition in which it ſtood in the tree from which it was taken; that is, the part which was originally next to the root, muſt ſtill point downwards.

This proceeding became a ſure means of quickening the annual operations of the trees which were the ſubjects of it. The trees bloſſomed ſometimes three weeks earlier than their neighbors, and ripened the fruit in proportion; which, for the firſt year, was pretty good.—The author has even had fruit from a pear-tree, which had not only thus loſt its bark, but even its *ſap-wood*, and the fruit was as good as uſual.—He has alſo ſtripped away, from *top to bottom*, the bark of large apple and of vigorous plum-trees; an operation, which, in his hands, in a ſingle year, has killed the ſmaller trees.* The larger trees have ſurvived two or three years; but though they produced prodigious numbers of bloſſoms, before the due ſeaſon, they never ripened their fruit, nor even had it of a conſiderable growth.†

M. Buffon relates, alſo, that, in order *to check a tendency to run into wood*, he *took off bark* from two branches of a quince-tree, in a ſpiral line, on the third day of April; which rendered theſe two branches productive of fruit, while the reſt of the tree was barren.—With the ſame view, he has *tied* a ſmall cord or ſome tow round a branch, or round the trunk, of a barren tree, and the bandage has produced fertility. The bandage did not break, but the bark thickened below, and ſtill more above it, (*il ſe forme ſeulement deux bourrelets*, &c. &c.) and ſometimes, even from the firſt or ſecond year, the bandage employed became incorporated into the tree.‡

Luxury would, probably, have led to the more frequent adoption of the methods of expediting the produce of the fruits of the year, pointed out by M. Buffon, had not artificial heat and ſhelter furniſhed the tables of the rich with ſummer and autumnal fruits growing almoſt in the winter and ſpring. It is poſſible, however, that the meaſures, which he has ſuggeſted, may ſtill farther accelerate the effects of the gardener's ſkill to which we refer, when the two methods here alluded to ſhall be employed together.

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* Mr. Du Hamel aſſigns a reaſon for this, which will be noticed in another communication to the ſociety.

† Unfortunately we are not told in what ſeaſon of the year theſe experiments were performed.

‡ See Memoirs of the Royal Academy of Sciences for 1738, p. 178, 180.

Let us conclude the preſent communication with this remark: When along with the powers of nature we combine the art of man, it is difficult to ſay what may not be produced. But it is neceſſary, for this purpoſe, *that the powers of nature ſhould be ſtudied.*—It is not impoſſible, that ſome curious *ſtudent*, who had read the account given by Mr. FRISCH, in the *Berlin* Miſcellanies, afterwards communicated to certain *New-England* farmers a hint of the daring procedure there recorded and noticed in the firſt part of the preſent paper. To lay aſide the bark of trees, as we lay aſide a garment, in order to put on a new one, was a bold and novel idea, fit for a ſtudent to make known; and as it appears (at leaſt for a time) to have proved ſucceſsful, it is important for the practical farmer to purſue it.

If the conjecture, here made, as to the *origin* of the vigorous practice in queſtion in *New-England*, be right, and if there be any merit in the other accounts, in this paper, collected from different writers, we may perceive of what uſe it may be to ſtore the *public libraries* of the State with the works of the learned. It is ſeldom that individuals, in this country, can furniſh themſelves with ſuch books as are here referred to; and a few thouſand dollars, employed in ſuch an object, can be of no value to a State, compared with the benefits likely to ariſe from an expenſe thus directed.

In *another paper*, we ſhall relate new uſes to be derived from ſtripping the ſtems of *timber* trees of their bark, for ſome time previous to their being applied to uſe; but here the art of the operator will be found to conſiſt in leaving behind in the tree only a *limited* degree of life; and not in producing a complete renewal and re-eſtabliſhment of the bark, with a view to a permanent prolongation of the exiſtence of the tree.

Kennebec, Jan. 1802.

POSTSCRIPT.

SEVERAL particulars have occurred ſince the preceding paper was written :

1ſt. I have again inſpected the fruit-trees in *Hallowell*, mentioned before as having had *the bark ſtripped from their ſtems*, in conformity to a practice which we find has long been witneſſed in *Pruſſia*.—The new bark I obſerved to be ſeparating from one or two of the ſtems; and by its thinneſs, it ſeemed to ſhew, that the firſt bark was only partially renewed. How long theſe trees will laſt, is uncertain; but I conceive that they will not profit by having the operation here in queſtion repeated upon them.—Theſe trees, it muſt be remarked, were not of the proper ſize when their ſtems were diſbarked ; they were diſbarked, alſo, becauſe they were originally unhealthy ; and it may be preſumed, that none will perform theſe operations upon trees which are in good condition. We ſhall, however, point out an application of the Pruſſian practice, before we conclude, which may, perhaps, render the knowledge of this practice in any event important, and thus repay us for the time beſtowed in conſidering and illuſtrating it, even ſhould objections occur to it in its original form.—In the mean time we go on to other remarks.

2d. The facility with which the wild cherry-tree ſubmits to the operation before us, may partly depend on the thinneſs of its bark, as alſo upon the degree in which it is tenacious of life ; for I have lately ſeen young ſtems of this tree, cut down in the autumn and thrown careleſsly aſide, which have put forth bloſſoms in the ſpring, 3d. Though I have myſelf, as well as Mr. MILLER, ſpoken of a *ſecond flow* in the ſap of trees, it will appear, from the concluſion of an intereſting account of "Experiments on the *motion of ſap* in trees," by Dr. WALKER, of *Edinburgh*, that the ſubject requires to be more attentively conſidered.—The following are the words of this gentleman, who was profeſſor of natural hiſtory in the univerſity of that city.

"We have found (ſays Dr. WALKER,) that, in the *early* ſpring, the ſap firſt begins to move at the *bottom* of the tree, and proceeds gradually upwards through all its parts; that the lower *bark* is firſt moiſtened by a ſap aſcending from the *root*, (and not by a ſap deſcending from the branches, which was generally ſuppoſed;) and farther, that, from the firſt movement of the ſap in ſpring till the *time of vernation*, no deſcending ſap whatever can be diſcerned in the tree.—Theſe indeed are important points againſt the doctrine of a circulation [of the ſap;] but I do not think that they completely diſprove it. They only prove, that there is no circulating ſap in a tree during a certain ſeaſon of the year; that is, from the time that the tree begins to bleed, till the appearance of the leaves. To determine the matter finally, it is neceſſary that the route of the ſap ſhould alſo be traced by accurate experiments, from the time the leaves firſt appear, till the defoliation of the tree in autumn.—What the reſult of ſuch an inquiry might be, I cannot determine: and I ſhall only obſerve, that from a few trials, made with this view, I have been led to ſuſpect, that *while a tree is in leaf* its ſap obſerves a very different courſe and moves by laws very different from thoſe by which it is regulated in the *bleeding* ſeaſon."—Thus far profeſſor WALKER.*

His remarks are rendered the more intereſting, by recollecting what has been ſaid in modern days by Meſſrs. DE SAUSSURE, INGERHOUZ and SENNEBIER, on the functions of the leaves in plants; a ſubject again

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* See the *Edinburgh* Phil. Tranſ. Vol. I, part 2. This paper was read before the Royal Society of *Edinburgh* in 1783 and 1786.

gain brought into view, and connected with the operations of the bark and ſap, by Mr. T. A. Knight.† It ſeems, in ſhort, that the ſap in the *ſpring* contributes to the unfolding of the leaves; and that, in general, the leaves, when once developed, perform various offices for the reſt of the plant; the powers of the upper ſide of the leaf differing from thoſe of the lower ſide. It remains to be conſidered whether there is not *always* an aſcending ſap, contributing to the growth and ſuſtenance of the leaves and young ſhoots; differing from certain juices which regularly deſcend from the leaves, after the leaves are once expanded; the leaves obtaining theſe juices both from within the tree and from without it.—How the *buds* are advanced in *winter*, is matter of uncertainty; but for that very reaſon meriting a farther inquiry. It poſſibly depends upon ſap depoſited in the preceding ſeaſon, in parts of the tree connected with the buds; the ſap being brought into action by the mild weather occaſionally occurring in the winter. This is confirmed by the caſe of certain ever-greens grafted upon ſtocks which ſhed their leaves; the heads of ſuch compound trees appearing to flouriſh in winter while the general vegetation of the ſtock is ſtagnant.

4th. Having myſelf made mention of the "*mid-ſummer* ſhoot" in certain trees, it is proper to add, that the laws of it ſeem as yet to have been little diſcuſſed by authors. Perhaps it will be found that it is an *autumnal*, rather than a *mid-ſummer*, ſhoot; following upon the abatement of the ſun's heat by day, and a ſucceſſion of cool nights; ſince, in the ſpring, it is found that the aſcent of the ſap is checked by great heats, though not ſo much as by great colds.

It will readily be perceived, that what regards the *courſe of the ſap* from the ſpring till the autumn, and the *progreſs of the annual ſhoots*, may be combined, by a diligent obſerver, into one inquiry.

5th. A remark is now to follow, ſuggeſted by a peruſal of the new work of Mr. Forsyth, (gardener to the king of *England*.[†]) His plan for the treatment of wounds and diſeaſes in trees, by a removal of the parts immediately affected, and by the ſubſequent application of a compoſition which favors the re-production of what is loſt, has been for ſome time before the public. But his new work, beſides pointing out a ſuperior form, (namely. a liquid one,) for his compoſition, enters into a wider field. He ſhews, that by cutting down a diſeaſed ſtem immediately above an eye or bud, and protecting the wound, a new head may be formed in three or four years; producing fine fruit and healthy wood; obſerving only, if the tree be grafted, that the eye proceeds from the grafted part. A ſyſtem of pruning is alſo given, both for ſtems and for branches; and in both caſes his directions are of great importance.—In ſhort, by combining and modifying the rules furniſhed by three Britiſh authors, namely, Meſſrs. HITT, BUCKNALL and FORSYTH, we may learn the chief of the management proper for orchards.—Mr. FORSYTH's work, eſpecially, contains principles which are invaluable.

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† See the *London* Phil. Tranſ. for 1801.

6th. As to the immediate ſubject of the preceding paper, namely, the diſbarking of defective trees, let what is ſaid there reſt upon its own evidence. It will exhibit a curious incident in the natural hiſtory of trees, together with a probable means of aſſiſting the fertility of ſuch trees, as poſſeſſing a certain degree of vigor, yet continue without fruit:—But ſtill more;

It remains to be conſidered whether the methods there deſcribed, may not be united with thoſe recommended by Mr. FORSYTH for the re-production of bark. If it be true, on the one hand, that the Pruſſian method of removing bark is uſeful, but that the Pruſſian method reſtores the bark only imperfectly; and, on the other hand, that Mr. FORSYTH's manner of reproducing

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[†] See a *Treatiſe*, on the culture and management of fruit-trees; in which a new method of pruning and training is fully deſcribed; to which is added, a new and *improved* edition of obſervations on the diſeaſes, defects and injuries in all kinds of fruit and foreſt trees, with an account of a particular method of cure. By WILLIAM FORSYTH, F. A. S. and F. R. S. 1802.

producing *bark* is effectual, but is not yet employed upon the Pruſſian plan, (being merely applied to caſes of neceſſary reparation,) it will be ſeen that there is ſtill ſomething new to be attempted. Caſes may eaſily be found, for example, where the Pruſſian mode of improving the old branches and head, will be preferred to Mr. FORSYTH's plan for creating new ones.

Two methods of mixing certain portions of the two operations will, therefore, be ſuggeſted, before we conclude this poſtſcript.—*Firſt*, in order to enſure an entire reproduction of bark in all its forms and thickneſs, through the aid of proceſſes iſſuing from the old bark, various pieces may be cut from the old bark of the ſtem in ſome regular manner, and the wood which is laid bare may be coated with Mr. FORSYTH's liquid compoſition; that by proceeding thus, annually, all the bark of the ſtem may be ſucceſſively removed and renewed. The worſt parts of the bark ſhould be among thoſe firſt taken away; and in order to preſerve a chain of communication between the roots and the branches, ſuch bark as remains at each time on the tree, (whether new or old,) ſhould be connected in the form of a network.—A *ſecond* method of intermixing, to a certain degree, the two operations, is to remove the old bark from the ſtem in the ſhape of *ſtripes*; leaving only a collar of old bark untouched above the roots, and another collar untouched below the branches, in order to enable the roots and branches more certainly to hold intercourſe with each other. After Mr. FORSYTH's liquid compoſition has been applied once to the wood and to the bark of ſuch a ſtem, perhaps the tree may be ſo invigorated, that it may become needleſs to proceed farther; and of this the experimenter muſt judge. In any event, the collars ought only to be removed piece by piece in different years, and without dividing too extenſively the lower parts of the bark from the upper.—As to the particular forms or dimenſions to be obſerved in cutting out the bark, experiments muſt govern; of which a profuſion may be made, ſince the American woods offer a profuſion of trees.

Principles ſimilar to theſe may be applied to the *large branches* of trees; for theſe may require to be refreſhed by theſe operations equally with the ſtem.

7th. A friend informs me, that in the *Weſt Indies*, by the advice of an acquaintance, and in order to enlarge the fruit, he took a young aligator pear-tree, having two branches; and ſlitting the ſtem of one of the branches, which was three or four inches in diameter, he removed two or three inches of the *pith* in length, from the heart within, ſo as to interrupt the communication of the *pith* above with the root. This branch, being firmly put together again, bore early; which the other branch did not; and its fruit was more fleſhy than common; but the ſtone was much ſmaller, and (according to the information received,) incapable of producing fruit.—Should this fact be verified upon an extenſive ſcale and for other trees, and the practice not be found to ſhorten life or produce other inconveniences; it may merit the attention of thoſe who have the care of orchards.—The ſuppoſed barrenneſs of ſeed, while the fruit containing it was enlarged, may remind us of the increaſe of bulk in oxen, capons, and ſome other animals, after they have been deprived of their ſeminal powers.

It leads alſo to the ſtill more important recollection, that it is the opinion of many eminent naturaliſts, that the power of producing ſeminal buds and ſeeds reſides in the *pithy* parts of the plant.—For example, we read this in Dr. WALKER's paper: "The ſubtle and ingenious theory of the generation of plants, given by LINNÆUS, which is countenanced by many excellent facts, is farther confirmed by theſe experiments; which ſtrongly inſinuate, that the tree is rather deſtined to ſupport the *pith*, than the pith the tree; the pith, according to that theory, being eſſentially neceſſary, not ſo much for the vegetation of the plant, as the formation of the ſeeds. Accordingly, in the numerous ſections of trunks and branches, made in the foregoing experiments, the buds were conſtantly obſerved to be connected with, and in a manner rooted in the pith, by means of diametral inſertions (or radiated lines of wood, which extend from the pith to the bark.) It may, alſo, be every where obſerved, that no bud exiſts upon any tree without a connection with the pith, and that buds are always in greater abundance where the pith is moſt copious."† In like manner, Dr. Darwin tells us, that "the pith appears to be the firſt or moſt eſſential rudiment of the new plant; like the brain or ſpinal marrow, which is the firſt viſible part, he believes, of every animal fœtus, from the tadpole to mankind." And, ſhortly after, he cites this paſſage from Mr. Bradley's diſcourſes on the growth of plants, in 1727. "Buds have their firſt riſe in the *pith*; they are there framed and furniſhed with every part of vegetation, and forced upwards to meet the air through the tender bark, and would drop on the ground, if they were not reſtrained by veſſels, which ſerve as roots to nouriſh them; and thus, as a ſeed takes root in the earth, a bud takes root in the tree.‡" Theſe intimations may ſuffice on this curious ſubject.

MEANS FOR INCREASING THE STRENGTH, &c. OF TIMBER.

By a Member of the Kennebec Agricultural Society.

Of ſeveral cheap and brief operations, which have been propoſed for increaſing the *ſtrength* and *durability* of certain ſpecies of timber, and for giving an immenſe increaſe of the *dimenſions*; to be employed while the timber is growing.

THE formation of timber, excelling both in quality and dimenſions, is a proceſs ſo gradual, while left to the common courſe of nature, that it is deſirable to know by what means the period of it may be abridged. The management of young plants, the pruning both of branches and roots, the ſituation for the trees, the improvement of the ſoil, and other ſimilar circumſtances, ſhall be paſſed over in ſilence; as being ſlow, or preparatory proceſſes only, or elſe, as being expenſive, or not ſuitable to trees of a certain deſcription, (as for example, to the full grown trees ſeen in the original woods of the United States of America.)

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† See Dr. Walker, as above.

See Dr. Darwin's Phytologia, p. 153 4.

Even the ſkilful treatment of the bark of trees, whether by waſhing, by rubbing, or by applying the knife to it, which has been ſucceſſively propoſed, with more or leſs variation, by certain Britiſh authors, (as Meſſrs. EVELYN, HALES, MARSHAM, and FORSYTH,) ſhall be left unnoticed; eſpecially ſince it is not aſſerted by Mr. MARSHAM, that the annual labor neceſſary to be beſtowed in this way, will more than double the natural progreſs of the ſtem, during the term of its being applied.

The methods now to be deſcribed are of a nature far more deciſive, and attended with little coſt and delay, and apparently with the beſt effects. They are chiefly collected from the writings of the celebrated Count BUFFON and M. DU HAMEL DU MONCEAU; each of whom was both conſulted and employed for objects of this kind by the French government.—We ſhall begin with the accounts of the former of theſe academicians.

In December, 1738, M. BUFFON read before the Royal Academy of Sciences at Paris, a memoir concerning "an eaſy method of increaſing the ſolidity, ſtrength and durability of timber," of which the whole ſecret is compriſed in a ſingle ſentence.—"Remove (ſays the author) the bark of the tree from the top to the bottom, while the ſap is in motion; and let the tree be kept ſtanding till its timber becomes dry."

M. BUFFON expreſſes his ſurpriſe, that he was left to be the firſt to announce this method of improving timber; eſpecially after VITRUVIUS, among the antients, had mentioned that a timber-tree might be ſpeedily prepared for uſe, by making a circular cut into its heart near the roots, and ſuffering it to ſtand upon its roots till it ſhould loſe its moiſture.—Mr. EVELYN alſo, he aſſerts, among the moderns, had related in his SILVA, on the authority of Dr. PLOT, that timber-trees in Staffordſhire, in England, after having been *diſbarked* [he ſhould have ſaid *diſbranched*] during ſap-time, were ſuffered to ſtand till the following winter, before they were cut down; and that, in the interval, not only the tree lived, but the wood became ſo much hardened, that the ſap-wood was conſidered as equal to the inner-wood.

Some of the firſt experiments of M. BUFFON on theſe ſubjects were as follow:

On the 3d and 4th of May, 1733, he ſelected ſix oaks of the ſort bearing the largeſt acorn, thirty or forty feet high, ſeventy years old, vigorous, and full of ſap. The whole ſix were ſtripped of their bark, from the top of the ſtem to the bottom, with a crooked tool [*ſerpe.*]—At the ſame time, ſix other oaks, as ſimilar as poſſible, were felled in their bark and *placed under cover.*

M. BUFFON, during more than two months, perceived no ſenſible change in the ſtanding trees.—On the 10th of July, however, the leaves on the ſouthern branches of *one* of them, whoſe ſap flowed the leaſt when it was diſbarked, faded, and were ſoon after dry; ſo that the tree was found leaf-leſs on the 26th of Auguſt, and cut down on the 30th. The axe could ſcarcely enter: it was even broken in the attempt: and the ſap-wood ſeemed harder than the centre of the tree, the tree being ſtill moiſt, and full of ſap within.

On the 13th of July, the leaves of a *ſecond* tree, which had alſo ſeemed leſs abundant in its ſap than the reſt, became tinged with yellow, and were all ſhed by the 10th of September. But as a quantity of internal ſap remained in this tree, the tree was kept ſtanding. Of the other *four* ſtanding trees, three ſhed their leaves only a few days before the uſual period; and the other, whoſe *top was ſlender* and little loaded with branches, even retained them during the uſual time: but all had their leaves and a portion of their ſuccors, on the ſouthern ſide, *dry* for many days preceding.

In the ſpring of 1734, theſe five trees appeared in leaf eight or ten days before their neighbors; but the growth of their leaves was ſoon checked.—The tree which had been the firſt to ſhed its leaves in the preceding autumn, loſt them this year, even during the heats of July, and was cut down on the 30th of Auguſt, one year after the felling of the firſt tree in 1733. Its ſap-wood appeared as hard as that of the firſt tree, and its heart, which was ſcarcely moiſt, was much harder. It was carried under the ſame ſhelter provided for the ſix trees left in their bark.

Of the four remaining ſtanding trees, three quitted their leaves in the beginning of September; while the fourth (which had the ſlender top) loſt them on the 22d of the ſame month. This latter therefore was preſerved, together with that which appeared moſt healthy among the other three, till the ſucceeding year.—The other two, which were cut down in the month of October of the ſame year (1734,) were found very hard under the axe, and nearly dry at heart. *One of them was left expoſed to the weather*, and the other was under the ſame ſhelter with thoſe which had retained their bark.

In the ſpring of 1735, the leaſt vigorous of the two remaining ſtanding trees ſeemed abſolutely dead; and, when cut in May, it was in effect found without the leaſt radical moiſture, as well as very hard *throughout*.—The other ſtanding tree (now the laſt of the ſix,) gave ſome ſigns of life by the ſwelling of its buds; but being incapable of expanding its leaves, the axe was applied to it ſome time afterwards.—Both of theſe laſt named trees were laid under the uſual ſhelter.

Upon a compariſon of ſimilar pieces of wood, *clear of ſap*, taken from four trees in each of the above claſſes moſt correſponding in their diameters, (for otherwiſe there would have been a new cauſe of difference,) reſults were obtained which will be found in the annexed table, compiled from the author's ſtatements. The differences in theſe reſults are in ſome degree progreſſive, in conſequence of the longer life of the trees noticed in the latter inſtances in the table; but even in thoſe trees which lived the longeſt, the advantages obtained are leſs than appeared in ſucceeding trials, as will be mentioned in its place.—It is only neceſſary to obſerve, that when wood is made *heavier* and *ſtronger*, the author conceives that it is the ſame thing as ſaying, that it is alſo made more *durable*

The pieces being taken from trees reſpectively deſcribed in the column underneath ;	And weighing reſpectively, as under ;	Broke reſpectively with the weight of
Tree diſbarked, and the firſt dead	242 pounds	7940 pounds
Tree not diſbarked	234 do.	7320 do.
Tree diſbarked, and the next dead	249 do.	8362 do.
Tree not diſbarked	236 do.	7385 do.
Tree diſbarked, & *expoſed to the weather*	258 do.	8926 do.
Tree not diſbarked	239 do.	7420 do.
Tree diſbarked, and having the *ſlender* head	263 do.	9046 do.
Tree not diſbarked	238 do.	7500 do.

Knots or other defects prevented ſimilar compariſons being made with pieces from the two remaining pairs of trees.

Other trials, however, were made, of which the nature and reſult were as follow :—1ſt. A piece of wood, ſomewhat defective, taken from the *top* of a tree which had been *diſbarked* and left expoſed to the air after it was felled, was upon trial found to weigh more and to ſupport more than a like piece, which was found, and taken from the *heart* of one of the trees felled in its bark.—2d. The *ſap-wood* of trees which had been *diſbarked* while ſtanding, was in like manner tried againſt ſap-wood from other trees which had been cut in their bark, and was found ſomewhat heavier, and conſiderably ſtronger.—3d. The ſapwood of diſbarked trees, if it did not equal the wood at the *heart* of the other trees in *weight*, yet exceeded it much in ſtrength.—4th. But the *outer* parts of the ſap-wood from diſbarked trees, contrary to the general rule, (which is a circumſtance highly worthy of remark,) were conſiderably ſtronger than the *inner* parts of the ſame ſap-wood.

The author explains the addition of ſolidity and ſtrength in theſe different caſes, by ſuppoſing that *the growth of the trunk (in the ordinary courſe of nature,) ariſes from layers of new wood which are applied to it externally, by means of the ſeveral juices flowing* between *the bark and the ſap-wood. Conſequently, when the bark is removed, though the trunk may live, it cannot increaſe in bulk; and the materials, deſtined for this increaſe, ſinking into the cavities of the veſſels of the ſap-wood and inner wood, harden the trunk throughout.*

For confirmation of this theory, the author refers to the following caſes of other trees, which were alſo ſlowly killed by the loſs of bark, though the bark which they loſt was in *ſmaller* quantities.

In December, 1733, M. Buffon cauſed a horizontal *girdle* or zone of *bark* of the breadth of three inches, and beginning about three feet from the ground, to be removed from many oaks of different ages; ſo as to intercept the ſap paſſing by the bark, and between the bark and the wood. It muſt be obſerved, that the bark only was cut, and not the wood.—In the enſuing ſpring, every thing proceeded as uſual, till May 22d; when the author perceived a little band (bourrelet) entering from *above* into the *upper* part of the vacancy. This band deſcended from between the bark and the ſap-wood of the trees which had been thus girdled; reſting upon the ſap-wood, and extending itſelf during the courſe of the ſummer, to the length of an *inch*. It grew moſt in proportion in thoſe trees which were young; but, unleſs perhaps as to thickneſs, its progreſs ceaſed after the firſt year.—*No band proceeded from below.*[*]—Of the whole number of trees of which the bark was thus *girdled*, none ſurvived longer than the fourth year; and few ſo long; eſpecially of the younger, or rather the ſmaller trees.

The operation, thus performed on a ſmall portion of the bark, ſomewhat improved the timber; but far leſs ſo than the operation upon the whole bark of the ſtem;—(for the author here ſtates the larger operation as improving the timber above twenty-five pr. cent.[†]) But it is here proper to obſerve, that the trees, of which the *bark was girdled* after the manner of our author, (namely, without wounding the wood,) continued to increaſe ſomewhat in ſize *above* the circle from which the bark had been removed. In his opinion, the band ſhooting down from the inner bark (*liber*,) between the outer-bark and the ſap-wood, was an apendage to, and connected with, an imperfect layer of wood, which was newly adding itſelf to the trunk.—The juices conſequently were thus far employed in a manner much conformed to nature; though leſs ſo below the zone, than above it; for *below* the zone, the bark (according to M. Buffon) probably obtained its chief ſuſtenance from the air, rather than from the ſide-veſſels of the ſap-wood.[‡]

An interruption then of the ſap, within certain bounds, appears, according to the author, to harden the wood *in proportion as it is complete*; and if the author's theory above ſtated, be correct, it has an application here too obvious for it to be repeated.—When the bark is removed, the ſap-wood in particular may be preſumed to become hard, from its abounding in pores;

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[*] "Au deſſous de cette ceinture, il ne paroiſſoit, et il ne parut jamais rien."—*Memoires de l'Academie des Sciences*, for 1738, p. 178.

[†] "La difference, qui dans les bois entiérement écorces eſt *de plus d'un quart*, n'eſt pas à beaucoup prés auſſi conſidérable ici; et même, n'eſt pas aſſez ſenſible pour que je rapporte les épreuves que j'ai faites à ce ſujet."—Thus aſſerts the original (p. 179,) a number of farther experiments being detailed which are paſſed over in this relation.

[‡] Query. Was the wood harder at, and below the girdle, than above it?

and as the pores are largeſt, according to him, || in the *outer* parts of this ſap-wood, it is hence perhaps that in the outer pores the greateſt change is effected.

Under theſe circumſtances (ſays M. Buffon) the ſap-wood is *no longer to be called* an imperfect wood; and it thus acquires an improvement in one or two years by being diſbarked, which it would not have obtained by the uſual courſe of nature in leſs than twelve or fifteen years, (this being the time requiſite for changing ſap-wood in to inner wood in the *beſt ſoils.*)—By joining then the ſap-wood to the other wood, the *bulk of a tree is in effect prodigiouſly increaſed*, and a tree of forty years old will go as far in work (according to M. Buffon) as a tree of ſixty years old in *common* circumſtances.

Whence, then, came the *origin of the prohibition in France* of taking the bark from trees while they were ſtanding?—Apparently, (ſays our author,) becauſe in woods which are cut down at ſhort intervals (that is, in coppice woods or copſes) the new ſhoots become few and weak.—But the author replies, that allowing this to be true as to the ſmall growth in copſe woods, it has nothing to do with timber-trees, (whether growing in large woods or left ſingle in copſes;) firſt, becauſe *old* roots ſeldom under any circumſtances reproduce any thing whatever; and, ſecondly, becauſe trees of a middle age will ſend up ſhoots, notwithſtanding they have been diſbarked.—Thus, for example, four of the timber trees which had been diſbarked by M. Buffon in his firſt experiment, yielded conſiderable ſhoots. The remaining two indeed had only feeble ſhoots; but theſe were preciſely the trees which had been found the leaſt provided with ſap.—The author agrees, however, that the tanners, for the ſake of the facility attending the diſbarking of *copſe* woods while ſtanding, ſhould not be allowed to purſue a practice which is certainly more or leſs detrimental.

The author's general concluſion is, that whenever the extenſive operation in queſtion in this paper is performed,

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|| This is directly to be inferred from page 180 of the *Memoir.*

formed, it ſhould be *during the great flow of the ſap; that is, when the veſſels are moſt open, and the ſap moſt in motion; and when both theſe circumſtances are likely to remain ſo for ſome time.*—By chooſing this period alſo for the operation, he adds, that it becomes eaſy to perform it; for in the proper time of the ſap, a man climbing upon a great tree may diſbark it from top to bottom *in leſs than two hours.*

All which has here been ſaid, however, relates to *oaks*; for upon oaks theſe experiments were in general made. But the practice may be extended probably to various other ſpecies of trees: M. BUFFON thinks to all.

Before M. BUFFON cloſed the above memoir, he received information from Mr. HICKMAN, a fellow of the Royal Society in London, ſtating, that the practice, which his memoir recommended, was in uſe in the county of Nottingham, in England. The bark (it is ſaid) was *better for tanning*, and the ſap-wood eſſentially hardened. But though the *ſap-wood* laſted *three* times as long as the ordinary ſap-wood, according to this account, yet its durability was not pretended to be equal to that of the wood within it.—The trees in Nottinghamſhire however were repreſented as ſtanding *ſix months* only, after loſing their bark.

But let us now quit M. BUFFON, to paſs on to his countryman and cotemporary, the ingenious, induſtrious and experienced M. DU HAMEL DU MONCEAU.

M. DU HAMEL preſented a memoir on the ſame general ſubject with that of M. BUFFON, in the ſame year, 1738; which was noticed in p. 54, 58 of the *Hiſtorical Articles* of the Royal Academy of Sciences (prefixed in thoſe days to the memoirs) for the year 1738; but the memoir itſelf was not then printed.—M. DU HAMEL ſays, that he reſerved it to form an article in his own publication *de l'Exploitation des Bois*. It ſtands accordingly in book third and chapter ſix of that work, which appeared in 1764; but the memoir was evidently retouched, ſince it ſpeaks of circumſtances obſerved in 1740 and 1742. It is poſſible that the author was led to ſuppreſs his own paper for a time, from a ſenſe of its inferiority in its original ſhape, compared with that of M. BUFFON; for his own experiments were only begun in the ſpring of 1738, whereas thoſe of M. BUFFON were begun five years earlier, and conſequently had a ſpace of time ſufficient for being rendered more complete.

The experiments of M. DU HAMEL, in general, were performed upon trees found in a wood of very vigorous growth, from forty to ſixty years old, (*une demi-futaie bien vigoreuſe*,) in which many ſtems had ſprung from old roots and ſtumps, ſo that he was ſometimes able to compare two ſtems growing from the ſame root.

He treated his trees in the three following manners. 1ſt. *He cut into them*, by removing all the bark and ſap-wood, and half an inch of the formed wood, to the height of twelve or fifteen inches from the ground. 2d. Or elſe he merely *diſbarked the foot of the tree*, to the height of two feet from the ground in the proper ſeaſon. 3d. Or laſtly, he *diſbarked the whole trunk*, as far as the point of projection of the lower branches.—Trees under the firſt treatment ſeldom ſurvived till the following year. Thoſe of the ſecond and third claſſes vegetated through a ſecond, and ſometimes to the beginning of a third year; there being little difference as to *time* between the reſults of the two laſt claſſes, † (except when ſometimes the ſuperior powers of life in one ſtem, prolonged the exiſtence of a ſiſter-ſtem ariſing from the ſame ſtock.) The difference, however, between the two laſt claſſes was conſiderable in other reſpects; the timber being only found materially improved, when the ſtem was *wholly* deprived of its bark, without wounding the wood.

The author follows the relation of his experiments with remarks; of which theſe ſeem to be the material points, though ranged in a new order.

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† This is an obſervation which merits to be noted by an inquirer into theſe ſubjects.

1ſt. He ſays, that the *red ſap*, ſpoken of by ſome authors, did not flow from the inciſions made into oaks employed in theſe experiments, nor indeed from like inciſions made into elms; (for this red ſap, as the author conceives, flows at an early ſeaſon of the year, *before* the opening of the buds whereas the above inciſions were made at a later period.)

2d. The author operated *while the ſap was in high flow*, both in order to ſeparate the bark eaſily, and becauſe his trees were liable to die when he began earlier.

3d. The annual productions from the trees which lived to the ſecond year, were earlier than thoſe of other trees; but they languiſhed alſo, earlier in the autumn, as generally happens with trees in a weak condition.

4th. He attributes the premature death of thoſe trees of which the wood had been wounded, to an interruption in the great canal for the *aſcending* ſap; which ſap, as he ſuppoſes, principally reſides in the *woody* fibres. †

5th. The death of the tree might alſo, as he conceives, be owing in part to an injury done to the *roots*, which, for want of ſap from above, ceaſed to have the neceſſary additions to the fibres below.

6th. To explain, to a certain degree, the two preceding remarks, we may obſerve, that M. DU HAMEL apprehends, that moſt plants and trees poſſeſs a *deſcending* ſap, which forms their roots, and an *aſcending* ſap, producing their branches, buds, and leaves.

7th. In conformity to this, he is of opinion, that the band (*bourrelet*) which occurs on the *upper* ſide of a wound in the bark, is produced by the deſcending ſap; this band ſometimes projecting downwards over the wound for a *foot* and a half. ‡

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† See a curious paper by the author, which touches upon this ſubject, in the beginning of the *Memoires* of the French Academy of Sciences for 1744, and which throws light upon ſome of the remarks which follow.

‡ M. BUFFON found this band only about an *inch* acroſs; but his girdle was narrower, and placed higher up on the ſtem.

8th. On the other hand, at the *lower* part of the wound in the bark, almoſt every ſtem had puſhed up new ſhoots from between the bark and the wood, (feebler, indeed, than the ſhoots from logs cut in the courſe of the winter, as having had a ſhorter period for their growth.)

9th. If trees, when merely diſbarked, could be properly ſheltered, ſo as to be kept from *drying*, he judges that the difference in favour of ſuch trees would be increaſed.—Accordingly, he attempted, but in vain, to ſhelter ſome of theſe trees.—He had indeed formerly aſſiſted, by artificial means, the *reproduction* of the bark in ſome inſtances of this kind; and the trees were ſtill ſubſiſting, though at the diſtance of fifteen or eighteen years from the time of this grand operation. But this was a meaſure too effectual for the preſent purpoſe; the actual regeneration of the bark being contrary to the object in view, which was merely that of hardening the wood.

10th. From what the author remarks, as to the effects ariſing from the drying of the woody fibres, he explains whence trees of large diameters ſurvive longer than thoſe of ſmaller diameters, when diſbarked; *more of their ſubſtance being removed out of the influence of the air.*—In confirmation of this he relates, the caſe of a copſe-wood of oak, which being diſbarked for the uſe of the tanner, the leaves faded during the day, and though they revived a little at night, they wholly died in the day enſuing.

11th. The *hardened* ſtate of the wood in the *diſbarked ſtems*, was not merely owing to theſe ſtems having become dry; as was proved by their being compared with other dry trees, which had *not* been diſbarked.

12th. The average *weight* of the diſbarked ſtems oppoſed to that of others not diſbarked, according to M. du Hamel, was as one hundred to ninety-three; and their average *ſtrength*, as one hundred to eighty-ſix.

13th. The wood which was heavieſt and ſtrongeſt among the diſbarked ſtems, belonged to trees which had *ſurvived* the longeſt.—The author's explanation of this fact, in effect, agrees with M. Buffon's, and is as follows: He ſays, that ſtems augment in bulk chiefly during the ſpring and ſummer; and yet that no increaſe in the bulk of the ſtems which were diſbarked, occurred; † though there was a prodigious evaporation of the ſap, through the medium of the leaves. He ſuppoſes, therefore, that what was *left behind in the ſtem*, as the ſap paſſed by, was employed in augmenting the weight, the hardneſs, and the ſtrength of the wood.—Hence he ſays it is, that the operation of diſbarking is more ſerviceable to large, than to ſmall trees, [for the large trees, by being the laſt to die, enjoy the longeſt courſe of vegetation.]

14th. Some of the ſtocks, from which the ſtems, experimented upon by our author, had ſprung, died under the operation: but the author conſiders this as no objection to the practice he recommends; ſince, he affirms, like M. Buffon, that the true method for procuring good timber is not by cheriſhing ſhoots from the roots of felled trees, but by raiſing timber-trees from the ſeed.

15th. M. du Hamel aſſerts, that by means of the operation propoſed in this paper, the ſap-wood remains ſound, without the precaution of being put under cover, contrary to what happens to other ſap-wood.

16th. Nor is it to be forgotten, that certain large *elms* which had been diſbarked in the month of May while ſtanding, and which had been felled in the September following, and put under ſhelter in December, were found to be ſound eighteen months afterwards.

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† M. Buffon noticed an increaſe in the *upper* part of trees, only in thoſe caſes where the *bark* of the ſtems had been *ſimply girdled*; whereas M. du Hamel is ſpeaking of what occurs in caſes where the *whole ſtem* had been diſbarked.

The following are the expreſſions of M. du Hamel:

"J'ai pris pareillement la groſſeur de mes *arbres écorcés*: aucun n'a augmenté ſenſiblement de groſſeur. Cela devoit etre; puiſque j'ai prouvé que les arbres augmentoient en groſſeur par des couches qui ſe formoient *entre* le bois et l'ecorce." Vol. I, p. 416.

But it muſt be added, that theſe elms were ſcarcely hardened; partly perhaps owing to their being felled too ſoon.

17th. Laſtly, M. DU HAMEL concludes his own memoir by recommending that of M. BUFFON above-noticed, which according to him proves, that nearly the ſame reſults have occurred in experiments on theſe ſubjects made in the eaſtern and weſtern quarters of France.

But let us introduce here an obſervation apparently of moment, which applies both to M. BUFFON and M. DU HAMEL.

Is it not ſingular that theſe authors ſhould unite in their explanation of the good effects following to timber, upon the removal of the bark from the ſtems of trees, and yet make no inquiry whether the *ſun* was not concerned in a *part* of theſe effects? When the bark is removed, *will not the ſun act with more force upon the ſtem?*

What proof, alſo, have we that the ſame preciſe juices, intended for *forming the new* wood, will harden other wood *already formed?* How do we know that the firſt named juices can be made even to enter the pores of the formed wood to advantage?

If we ſhall once allow, that when a freer action is permitted to the ſun, it may change the quality or even the quantity of the juices of the ſtem, (by evaporation or otherwiſe,) we can then ſee the reaſon, perhaps, why M. BUFFON made the *outer-layers of the ſap-wood* in his experiments become ſuperior to the inner layers; why, alſo, the timber of ſtems which are *wholly* diſbarked, is better than that of ſtems of which the bark is *merely girdled*: and why, laſtly, the hardeſt and heavieſt woods are found in the *hotteſt countries*.—This conjecture, however, as to the ſhare which the ſun may have in the operations principally in queſtion in this paper, muſt not be puſhed too far, for not only (as has been hinted) trees are ſaid to have their timber hardened merely by loſing their *branches*; but among the ſtems which are deprived of their *bark*, the ſmaller ones, (though moſt eaſily penetrated by the ſun,) are thoſe of which the timber is the leaſt improved by this operation.—Perhaps, however, ſtems without *branches* and ſtems without *bark*, may each afford a ſlow paſſage to the ſap, ſo as to keep the ſap longer under the action of the ſun; and perhaps, alſo, ſmall ſtems, after they are diſbarked, may be expoſed to the further inconvenience, of having their ſap too *powerfully* acted upon by the ſun to ſurvive it.—But this by the by.

We may take the preſent opportunity of ſuggeſting the propriety of an inquiry, whether fruit-trees which have been long ſtripped of their bark on account of diſeaſe, acquire any additional hardneſs to their wood, as the reſult of their new bark being *thin*; and if ſo, whether the hardening of their wood was not one among the particulars neceſſary to render them *productive*; and laſtly, whether ſuch trees have *grown* as faſt in their ſtems and branches, as the generality of other trees correſponding in ſize and ſituation?—At the ſame time it may be worthy of examination, whether a ligature placed round a branch, after the manner recommended by M. Buffon, has in the end any effect upon the *ſolidity* of the wood within, at leaſt till the *growth of the branch is checked?*

The query here propoſed, reſpecting the operation of the ſun, may be extended to that of the *air*, the *rain*, the *froſt*, and even the *light*.—Internal proceſſes in the tree, ſuch as *fermentation of the ſap*, may alſo have influence on this occaſion.

It is now time, however, to exhibit the paſſage from Mr. Evelyn, to which M. Buffon was ſeen to refer above, though he will be found to have miſrepreſented it in a remarkable manner. Yet M. Buffon was a ſufficient ſtudent in the Engliſh language to make himſelf firſt known to the public, in early life, by a

tranſlation

tranſlation of the famous *Statical* Eſſays of the Engliſh Dr. HALES.

The paſſage in queſtion opens to us ſeveral important views in the general inquiry before us, of which a part have been already anticipated.—It will be found at p. 516 and 517 of Dr. HUNTER's magnificent edition of Mr. EVELYN's Silva.

"Dr. PLOTT (ſays Mr. EVELYN) recommends the *diſbranching* [not diſbarking] to be done in the ſpring, before felling, whilſt the tree is ſtanding; that is, from May to Michaelmas, and ſo let it continue till the next ſpring, and diſburthen them, [that is, diſbark the trees, &c.] when felled, as the cuſtom is in Staffordſhire and the north, for exceedingly contributing to a dry ſeaſoning, freeing it from the attacks of *worms* and other accidental corruption. And [he] thinks that the prejudice accruing thereby as to the tanner, (in regard to the more difficult excortication) [that is, diſbarking,] is no way to be put into balance with the advantage and improvement of timber for paling, building of ſhips, houſes, &c.—Accounting the method of that importance, as to merit the deliberation of a parliament." Thus far Mr. EVELYN.

If we adopt the theory of Meſſrs. BUFFON and DU HAMEL, it ſeems eaſy to conceive whence the timber of certain trees may become benefited by a removal of their *branches*, (while the tree is ſtanding.) If the roots and ſtem continue uninjured, much ſuperfluous ſap may now remain in motion; of which a large portion may be depoſited in the pores both of the ſap-wood and of the formed wood, ſo as to improve each of them.—Of the *exiſtence* of this ſap in many felled trees, in a manner capable of producing buds and ſhoots, without the aid either of the leaves or even of new ſupplies from the roots, we have evident proof from the buds and ſhoots and even bloſſoms which ariſe in the ſpring from certain ſtems newly cut down when without a leaf.

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How far it may be adviſeable to *diſbark* and to *diſbranch* one and the ſame tree, is matter for future experiment, and may lead to ſome deciſive facts.

It ought not, however, here to eſcape notice, that trees hardened by the loſs of their *branches*, are affirmed to be freed from the attack of "*worms* and other accidental corruption"—If this be true, we have a new conſideration addreſſed to our attention, which will equally well apply to the caſe of *diſbarking* timber-trees.

Notwithſtanding what has been ſaid by Meſſrs. BUFFON, DU HAMEL and EVELYN, reſpecting the benefits which ſeem to follow from theſe artificial proceſſes, for increaſing the dimenſions of timber in ſtanding trees, it appears poſſible to add to the liſt of theſe advantages. The following conſiderations will include a part of what is to be ſaid on this ſubject.

1ſt. The *outer* circles of the wood in all trees being largeſt, and therefore containing moſt timber, the increaſe of timber by the methods here deſcribed, falls upon the outer, that is upon the *largeſt* circles of the tree.—This conſideration will remove all doubt as to the accuracy of the computations in M. BUFFON's memoir.

2d. Theſe contrivances, by hardening the outer wood, may leſſen the quantity of *offals* from timber, and therefore tend to diminiſh the expence both of labour and of carriage.

3d. If timber can be hardened on *foot*, according to the French phraſe, that is, as it ſtands, it may be *removed* at that ſeaſon of the year, which is moſt convenient for cutting it down and tranſporting it.

4th. If timber, alſo, can be ſeaſoned as it ſtands, it will ſuffer little from *wet*, which injures other trees left to be ſeaſoned in the open air.

5th. The expenſe of buildings, of docks, and of other apparatus, for the ſeaſoning of timber, with the ſtagnation of capital during the period of its ſeaſoning, may be ſpared, if it be true that timber can be prop-early ſeaſoned while ſtanding in the woods, by the methods above propoſed.

6th. If theſe methods have in truth the good effects thus attributed to them, they may in ſome degree render needleſs the diſpute as to the *ſeaſon of the year proper for felling certain timber trees.*—Some uncertainties, which have exiſted on this ſubject, may be ſeen in M. du Hamel's account of the contradictory practice prevailing reſpecting it in his time, in different countries. It may be curious to obſerve, that in our day, Mr. Snodgrass, the ſurveyor of the ſhipping in the Eaſt India Company's ſervice, (than whom no man perhaps has ſeen and heard more on the ſubject, as far as concerns England and the Eaſt Indies,) is in favour of Engliſh timber which is *winter-fallen.*† Indeed the queſtion may admit of different deciſions in different countries; eſpecially as relating to trees of different ſpecies and of different ages.

Againſt all theſe advantages, we muſt not admit it as any objection, that hard timber is alſo hard to work: for upon this principle none but ſoft woods ought to be employed in work: In other words, to reduce the firſt coſt of the work, we muſt ſacrifice all the attention due to uſe and to durability.

But it is time to make a remark applicable to the United States. It is this:

Diſcuſſions concerning the improvement of timber are peculiarly important in a vaſt continent poſſeſſed of wilderneſſes of woods, for the timber of which more extenſive markets would offer, were it in better repute for ſtrength and durability. An *increaſe* of exportable timber would lead to an increaſe of freights and of ſeamen;

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† See his letter to Mr. Dundas, with an appendix, printed in 1797, p. 49;—in which are many valuable facts for ſhip-builders. Out of 989 veſſels built or repaired under his inſpection in 37 years, only one had foundered; while in the Britiſh navy above 60 veſſels are ſuppoſed to have foundered in 9 years (from 1775 to 1784.) M. du Hamel ridicules the idea of attending to the falling of timber in particular periods of the *moon.* (See b. 3, Ch. 5.)

men: At the ſame time that an improvement in the *qualities* of timber, would add to the calls for ſhip-building, and be highly ſerviceable to domeſtic carpentry. Theſe conſiderations will derive new weight from recollecting that the American woods contain a profuſion of *large trees*; the chief of which are not only deſtitute of the ſolidity belonging to trees found in paſtures; but, by being drawn up in conſequence of having grown in company, acquire long trunks with few branches, ſo as to admit of being diſbarked with eaſe up to the true height.

To *what* heights in the ſtem, in different ſpecies of trees, and at different ages, and under different circumſtances, this diſbarking may be carried, is to be decided by actual trials.—It ſeems reaſonable, however, to preſume, that ſo much of the upper part of the tree ought to retain its bark, as ſhall be neceſſary for procuring to the part which is diſbarked, its due ſupply of ſap.

A fact of a miſcellaneous nature ſhall now be introduced, for it may be found to have application to the preſent ſubject.

On the meadow-land (otherwiſe called interval-land) overflowed by the dam of the upper mill at Cobeſſee, below Hallowell, many trees have been ſtanding for a long courſe of years, which though without vegetation, in conſequence of the action of the water upon their roots; yet ſtill remain erect, and (to appearance) tolerably firm. They ſoon ceaſed to live as trees, but yet long exiſted as timber, though expoſed to all the injuries of the weather. They alſo ſeem to be more free from moſs and other "accidental cauſes of corruption," than could from former theories, have been ſuppoſed probable; though ſome, which were ſawed after a long period had elapſed, were found too much worm-eaten to be uſed as *plank* for ſhipping.

Thus we have diſcuſſed a ſubject of conſiderable national importance, *ſolely* by the aid of books not commonly found in *private* libraries in the United States; and hence have given (as it is to be hoped) an additional proof of the neceſſity of increaſing our *public* libraries.

To prevent miſapprehenſion, however, at to our general ſubject, in perſons living in parts of the United States, where the practice of *girdling* trees in the American form, is adopted, it may be proper to make the following diſtinction.—The object of the operations in view in this paper is, to retain a *lingering life in trees* for a certain period. The farmers, on the other hand, who girdle their trees, ſeek to procure an inſtant death to the leaf, and an early death to the tree; that they may immediately raiſe crops, and ſoon plough the ſoil without obſtruction. They make a cut (or girdle as it is called) round the ſtem of the tree, paſſing through the bark into the *wood itſelf*, in order to interrupt the communications within the tree, by which the life of the tree is ſupported.—Objects and proceedings therefore ſo oppoſite, admit of little compariſon in any point of view.

A ſecond reflection ſhall here be introduced; which is, that we ſhould not ſuppoſe that the learned French Academicians from whom we have extracted the chief materials for this paper, have miſtaken *brittle* wood for *ſtrong* wood:—They conſidered ſtrength and toughneſs in all their experiments. This, however, did not prevent their diſcovering, that the wood of the diſbarked ſtems was *hard*, as well as *heavy*; the ſtrength being in proportion to the weight.—It may at the ſame time be allowed, becauſe it is true, that the beſt timber, *in proceſs of time*, when kept dry, will acquire a brittle hardneſs, ſo that even ſoft pine-wood ſhall change its qualities in this reſpect. But ſince all this timber began with being more or leſs tough, according to its nature, we have no unfavorable concluſions to draw from it; particularly as worms ſeem to avoid this brittle wood, which is accordingly found untouched by them in various buildings in Europe erected many centuries ago.

A third caution, alſo, is neceſſary, which has a more general application.—The experiments related in this paper have not been repeated by the compiler of it. Yet a repetition of them is neceſſary ; and at the ſame time they ought to be extended, and the reſult of the whole communicated to the public. By this means we ſhall poſſeſs, in time, approved rules for operating upon different kinds of trees in different climates, and different ſituations ; and none will be better circumſtanced for the purpoſe of benefiting by theſe rules, than the inhabitants of the United States, whoſe timber trees are ſo many and ſo various, and are ſpread through ſo many latitudes, longitudes, elevations, aſpects and ſoils.—We add, that from the ſame cauſes, few have better opportunities than the inhabitants of the United States for *making ſuch experiments.*

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ACCOUNT OF A METHOD OF PREVENTING THE DECAY OF PEACH TREES.

By JOHN ELLIS, *of New-Jerſey.*

"THE decay of peach-trees is owing to a worm, which originates from a large fly, that reſembles the common waſp : this fly perforates the bark, and depoſits an egg in the moiſt or ſappy part of it. The moſt common place of perforation is at the ſurface of the earth, and as ſoon as the worm is able to move, it deſcends into the earth, probably from an inſtinctive effort to avoid the winter's froſt. This may be aſcertained by obſervation ; the tract of the worm from the ſeat of the egg being viſible at its beginning, and gradually increaſing, in correſpondence with the increaſing ſize of the worm : its courſe is always downwards. The progreſs of the young worm is extremely ſlow, and if the egg is depoſited at any conſiderable diſtance above the ſurface of the earth, it is long before the worm reaches the ground. The worms are unable to bear the cold of winter unleſs covered by the earth, and all that are above ground after froſt are killed.

"By this hiſtory of the origin, progreſs and nature of the inſect, we can explain the effects of my method, which is as follows: In the ſpring, when the bloſſoms are out, clear away the dirt, ſo as to expoſe the root of thetree, to the depth of three inches; ſurround the tree with ſtraw about three feet long, applied lengthwiſe, ſo that it may have a covering one inch thick. which extends to the bottom of the hole, the but ends of the ſtraw reſting upon the ground at the bottom. Bind this ſtraw round the tree with three bands, one near the top, one at the middle, and the third at the ſurface of the earth; then fill up the hole at the root with earth, and preſs it cloſely round the ſtraw. When the white froſts appear, the ſtraw ſhould be removed and the tree ſhould remain uncovered until the bloſſoms put out in the ſpring.

"By this proceſs the fly is prevented from depoſiting its egg within three feet of the root, and althought it may place the egg above that diſtance, the worm travels ſo ſlow that it cannot reach the ground before froſt, and therefore is killed before it is able to injure the tree.

"The truth of the principle is proved by the following fact—I practiſed this method with a large number of peach-trees and they flouriſhed remarkably, without any appearance of injury from the worm, for ſeveral years: I was then induced to diſcontinue the ſtraw with about twenty of them. *All thoſe which are without the ſtraw have declined, while the others, which have had the ſtraw, continue as vigorous as ever.*"

CULTIVATION OF PEACH-TREES.

Deſcription of a method of cultivating Peach-Trees, with a view to prevent their premature decay; confirmed by the experience of forty-five years in Delaware State, and the weſtern parts of Pennſylvania.

By THOMAS COULTER, *Eſq. of Bedford County, Penn.*

"THE death of young peach-trees is principally owing to the planting, tranſplanting and pruning *the ſame ſtock*, which occaſions it to be open and tender with a rough bark; in conſequence of which inſects lodge and breed in it, and birds ſearch after them, whereby wounds are made; the gum exudes, and in a few years the tree is uſeleſs. To prevent this, tranſplant your trees as young as poſſible; if in the kernel it will be beſt, as there will then be no check of growth. Plant them ſixteen feet apart. Plough and harrow between them, for two years, without regard to wounding them, but avoid tearing them up by the roots. In the month of March or April, in the third year after tranſplanting, cut them all off by the ground, plough and harrow among them as before, but with great care to avoid wounding or tearing them. Suffer all the ſprouts or ſcions to grow even if they ſhould amount to half a dozen or more: they become bearing trees almoſt inſtantaneouſly on account of the ſtrength of the root. Allow no animals but hogs to enter your orchard, for fear of their wounding the ſhoots, as a ſubſtance drains away, through the leaſt wound, which is eſſential to the health of the tree and the good quality of the fruit.

"If the old ſtock is cut away the third year after tranſplanting, no more ſhoots will come to maturity than the old ſtump can ſupport and nouriſh: the remainder will die before they bear fruit, and may be cut away, taking care not to wound any other ſtock. The ſprouts, when loaded with fruit, will bend and reſt on the ground in every direction for many years, all of them being rooted as if they had been planted, their ſtocks remaining tough and their bark ſmooth for twenty years and upwards. If any of the ſprouts from the old ſtump ſhould happen to ſplit off and die, cut them away; they will be ſupplied from the ground by others, ſo that you may have trees from the ſame for 100 years as I believe. I have now trees from one to thirty-ſix years old, all from the ſame ſtump. Young trees, formed in this manner, will bear fruit the ſecond year, but this fruit will not ripen ſo early as the fruit on the older trees from the ſame ſtump. Three years after the trees are cut off, the ſhoots will be ſufficiently large and buſhy to ſhade the ground ſo as to prevent the growth of graſs that might injure the trees, therefore ploughing will be uſeleſs and may be injurious by wounding them. It is, alſo, unneceſſary to manure peach-trees, as the fruit of manured trees is always ſmaller and inferior to that of trees which are not manured. By manuring you make the peach-trees larger and apparently more flouriſhing, but their fruit will be of a bad kind, looking as green as the leaves, even when ripe, and later than that of trees which have not been manured. Peach-trees never require a rich ſoil; the poorer the ſoil the better the fruit; a middling ſoil produces the moſt bountiful crop. The higheſt ground is the beſt for peach-trees, and the north ſide of hills is moſt deſirable, as it retards vegetation, and prevents the deſtructive effects of late froſts, which occur in the month of April in Pennſylvania. Convinced by long experience of the truth of theſe obſervations, the author wiſhes they may be publiſhed for public benefit, and has been informed that Colonel Luther Martin, and another gentleman, in the lower part of Maryland, have adopted a ſimilar plan with great advantage."

ON RAISING FOREST TREES FROM SEED.

A Communication, addreſſed to the Truſtees of the *Maſſachuſetts Society for Promoting Agriculture*, by Col. ROBERT DODGE, of *Ipſwich*. The Society's premium of 100 dollars, or the gold medal, was adjudged to the Author for his exertions.

THE annual conſumption of wood, in this part of the country, greatly exceeds the annual growth. Fuel, which is of the firſt neceſſity, is become one of the moſt expenſive articles in the ſupport of a family—and the demand and price of timber for building and mechanical purpoſes are, every year, increaſing. The publication of the *Maſſachuſetts Society for promoting Agriculture*, being put into my hands in September, 1797, ſtimulated by the premiums offered by the Truſtees, and the hope of encouraging ſimilar attempts, I determined to turn my attention to the cultivation of white oaks and other foreſt trees.

Conceiving that I was poſſeſſed of land well adapted to the growth of foreſt trees, I made choice of a piece of ground on the northern ſide of a hill, or high ſwell of land, and pretty near the ſummit, from which there was a gradual deſcent in every direction. It had formerly been covered with a very heavy growth of white and yellow oak, and the different kinds of walnut, or hickory, growing native in this part of the country. For many years paſt it had been improved as a paſture, having ſeveral trees of the ancient growth ſcattered over and ſtill ſtanding upon it. The piece of ground on which I propoſed to make the experiment contained about two acres, and was, for the firſt time, ploughed up two years before, and in each of the preceding years planted with Indian corn. The native ſoil is a pretty deep rich mould, inclined to moiſture, and very rarely pinched with drought. Detached rocks of different ſizes are ſcattered over it. The two acres were incloſed with a good fence for the purpoſe of forming a foreſt tree nurſery. It was then ploughed once, and harrowed ſufficiently to render the mould light and fine, and furrowed both ways, viz. at right angles, about four and an half feet diſtant. On a ſmall part of the ground a little barn manure was put in the angles of the furrows ; but on the greater part no manure of any kind was laid.

The ground having been thus prepared, on the 10th of October, 1797, it was planted in the croſs furrows, in the form of hills ; a part with white and yellow oak acorns ; a part with that kind of walnuts called the ſhag-bark ; a part with cheſnuts, and a part with oil-nuts, or white walnuts. Four acorns and four nuts were put in a hill through the whole nurſery, and covered about three, and three and an half inches deep.

The labour, in preparing the ground, was two and an half day's work of one man and a boy with two pair of oxen, and the man and the boy one day in planting and covering the ſeed.

Deſirous of varying the experiment, I had another piece of ground, containing one quarter of an acre, of a ſoil and ſituation nearly ſimilar, prepared in the ſame manner. On the firſt day of November I ſowed it, by broad ſtrow, with the ſame kind of acorns and nuts, and with the ſeeds of white aſh, and then harrowed the ground with an iron-tooth harrow.

Juſt before the froſt ſet in I examined the hills in the nurſery, and found the acorns generally ſprouted, and ſome of the ſprouts more than two inches in length. The nuts appeared in the ſame ſtate in which they were planted. In the ſpring following, I could find only four of the acorns which had ſent up ſhoots out of the ground, and the nuts did not ſwell ſufficiently to burſt their ſhells. But thoſe ſowed by broad ſtrow came up pretty well, and I had them tranſplanted into a part of the nurſery. From theſe circumſtances I concluded that the acorns and nuts planted in the nurſery, were put into the ground too early in autumn, and were covered much too deep.

Diſappointed in the firſt attempt, I was ſtill determined to make another trial on the ground incloſed for a nurſery. In the latter part of October, 1798, I plowed, harrowed and furrowed it juſt as I had done the preceding autumn; and on the firſt day of November I planted in the croſs furrows, as before, white and yellow oak acorns, ſhag-bark walnuts, cheſnuts and oil-nuts, and covered them, excepting four rows, much lighter than the preceding year. The acorns and nuts came up very well, excepting the four rows which were covered about three inches deep. In theſe rows very few appeared in the ſpring. By this and ſimilar experiments made ſince, I have found, that both acorns and nuts vegetate beſt when only covered over ſo lightly as that no part of them can be ſeen above the ſurface. On the ſame day I planted a ſmall quantity of the ſeeds of the elm collected at the time of the ſeed's falling, which came up remarkably well.

To extend the experiment, I prepared a ſeparate piece of ground, by ploughing and harrowing it, as I had done in the nurſery. On the 2d of November, I ſowed, by broad ſtrow, about five hundred of the ſhag bark nuts, and left them on the ſurface of the ground uncovered. As ſoon as the froſt was out in the ſpring ſufficiently to admit the plough, which was about the laſt of March, or the firſt of April, I ploughed them in very lightly. The nuts ſoon ſprouted, and about the middle of May appeared above the ſurface. Moſt of them vegetated and came up far better than any of the other nuts or acorns.

Care has been taken to keep all the foreſt trees pretty clear of weeds. The nurſery has been ploughed and hoed three and four times in the courſe of each ſummer, but no hills have been raiſed about the trees. The labour in tending the ground has been about the ſame as tending ſo much Indian corn, and the ploughings and hoeings, about the ſame time in the ſummer.

The growth of the ſhag-bark walnuts has been remarkably ſlow. The acorns grew conſiderably the two firſt years, but the laſt ſummer they appear to have increaſed ſomewhat in ſize, moſt of them very little or none at all in height; ſome of the largeſt, however, have produced luxuriant tops. The cheſnuts, oil-nuts and elms, have grown well. Of all the kinds, the white-aſh has much exceeded in rapidity of growth.

In the laſt autumn I had growing upwards of four thouſand and two hundred trees, from all the kinds of acorns, nuts and ſeeds which I had planted. But my nurſery, which was on ſloping ground, was greatly injured by an unuſually heavy rain, juſt before the froſt ſet in. The fall of rain was ſo great as to occaſion ſeveral ſtrong currents of water, which produced deep gullies through the longeſt direction of the ground. By this unfortunate circumſtance, more than ſix hundred trees were torn up and deſtroyed.

There are now growing (Oct. 13, 1801) from the acorns, nuts and ſeed which I have planted, which are three and four years old this autumn from the time of planting, *two thouſand ſeven hundred and ninety-two* white and yellow oaks—*four hundred and twelve* ſhagbark walnuts—*forty-eight* oil-nuts—*one hundred and ten* cheſnuts—*two hundred and thirty-nine* elms—and *forty-one* white-aſh.—The whole number, *three thouſand ſix hundred and forty-two.*

ON RAISING FOREST TREES FROM YOUNG SHOOTS OF WOODLOTS.

A Communication addreſſed to the *Maſſachuſetts Society for Promoting Agriculture*, by MOSES BULLEN, Eſq of *Medfield.*—The premium of 30 dols. or ſilver medal, was adjudged to the Author for his exertions.

I HAVE, for more than 20 years, turned my attention to raiſing foreſt trees, and have had the ſatisfaction of ſeeing my endeavours crowned with ſucceſs. The method, by which I have ſucceeded, is as follows: When the wood is arrived at maturity on a piece of land, I cut it all down, leaving not a ſingle ſtand; then I paſs over the land with a ſtrong ſcythe, making it compleatly clean by cutting all the ſhrubs and buſhes, which were kept under by the large trees and cattle, and which, if ſuffered to remain, would obſtruct the growth of the young ſhoots. After doing this, I generally have a fine thrifty parcel of young plants and ſprouts, which grow rapidly. When the growth is about 4 or 5 years old, I go over it again, and cut the pooreſt ſorts of wood, where there are enough of better; and alſo once in 2, 3 or 4 years, prune as many as my other avocations will allow. Many of the firſt trees I raiſed are large enough for hogſhead hoops, and many much too large. I have had more than 4000 poles, of the hogſhead kind, cut within a few years on 10 acres of my young trees, without thinning them too much, (I am very careful that all the beſt poles are not taken, which is commonly the caſe, where an indifferent perſon is ſuffered to go into a woodlot for the purpoſe of cutting hoop-poles, to the great detriment of the owner.) This method I have taken for raiſing foreſt trees, I conceive to be the beſt and cheapeſt, that can be adopted in this part of the country. I have, by way of experiment, planted acorns, cheſnuts, walnuts, and ſet ſlips of the Engliſh green willow; but have never had great ſucceſs. On lands long cleared, and the growth entirely killed, I ſuppoſe ploughing and planting acorns, &c. as recommended by Dr. DEAN, to be the beſt. It is abſolutely neceſſary to keep cattle and ſheep away from the land where it is propoſed to raiſe foreſt trees.

When I firſt began to raiſe trees for wood, I uſed to leave ſome of the young thriftieſt ſtands to grow ſcattering on the land. But a few years convinced me of my error, for the trees, ſo left, ſoon ſent out their branches horizontally, preventing the growth of ſmaller trees, ſituated near them, and not growing high themſelves, affording little timber and much bruſh.

I every year clear a parcel of land, where I cut my fire wood, ſo that I have young trees from one to twenty years growth.

Experience has ſhowed me, that the ſprouts of cheſnut grow much more rapidly, than thoſe of other wood, obſtructing their growth. In this caſe, I found it advantageous to cut them down, eſpecially ſuch as are crooked and full of branches. Freſh ſprouts will ſoon ſpring up from the root, which will commonly overtake thoſe of the ſurrounding growth, making much better and ſtraighter timber with fewer limbs.

FORSYTH ON THE MANAGEMENT OF TREES.

OF PEAR TREES.

THE method of pruning pear-trees is very different from that practiſed for apple-trees in general. The conſtant practice has been, to leave the great ſpurs, as big as a man's arm, from one foot to eighteen inches long. The conſtant pruning inevitably brings on the canker ; and, by the ſpurs ſtanding out ſo far, the bloſſoms and fruit are liable to be much injured by froſt and blighting winds, and thus the ſap will not have a free circulation all over the tree. The ſap will always find its way firſt to the extremities of the ſhoots ; and the ſpurs will only receive it in a ſmall proportion as it returns from the ends of the branches. The fruit ſtanding at ſo great a diſtance from the branch, is liable to be hard, ſpotted and kernelly.

I have adopted the following method when the trees were all over cankered, and the fruit ſmall, and not fit to be ſent to the table : I cut the tops off as near as poſſible to where they were grafted ; always obſerving to cut as cloſe to a joint or bud as poſſible. The buds are hardly perceptible, but you can always know where the joints, or forks, are, by the branches breaking out of the ſides.

I began with cutting down four old decayed pear-trees of different kinds, near to the place where they had been grafted. This operation was performed on the 15th of May, 1786. Finding that they put forth fine ſhoots, I headed down four more on the 26th of June in the ſame year, (for, by this time, the former had ſhoots of a foot long,) which did equally well, and bore ſome fruit in the following year. One of the firſt four that I headed down was a St. Germain, which produced nineteen fine large well-flavoured pears next year, and in the third bore more fruit than it did in the former ſtate when it was four times the ſize.

By the above ſtatement it appears, that the trees headed down bore upwards of five times the quantity of fruit that the others did, and it keeps increaſing in proportion to the progreſs of the trees.

On the 20th of June, I headed ſeveral ſtandards that were almoſt deſtroyed by the canker. Some of them were ſo loaded with fruit the following year, that I was obliged to prop the branches, to prevent their being broken down by the weight of it. In the fourth year after theſe ſtandards were headed down, one of them bore *two thouſand eight hundred and forty pears*. There were three ſtandards on the ſame border with the above, two of which were St. Germain's; the old tree was of the ſame kind. One of theſe trees, twenty years old, had five hundred pears on it, which was a great crop for its ſize. So that there were on the old tree, which had been headed down not quite four years, *two thouſand three hundred and forty pears* more than on the tree of twenty years growth.

When you prune the trees, which ſhould be done in February or March, (not ſooner than the middle of March in America,) always cut cloſe to an eye or bud, obſerving where you ſee the greateſt number of leaves at the lower bud, and cut at them; for at the foot-ſtalk of every one of theſe will be produced a flower bud. You will have, in ſome ſorts of pears in a favourable

ſeaſon,

ſeaſon, from five to nine pears in a cluſter. This cutting ſhould not be later than March or the beginning of April, on account of the leading ſhoot beginning to grow. The next topping, when the leading ſhoot grows quick enough to admit of it, ſhould be about the middle of June, (latter end of June in America,) and the length of the ſhoots ſhould be according to their ſtrength, having from three eyes or buds to ſix on a ſide.

The cankery part beginning to effect the new bark, I cut off all the canker at the bottom laſt year, and plaſtered the place with ſome cow-dung mixed with wood aſhes and powder of burnt bones, put into as much urine and ſoap-ſuds as would make it of the conſiſtence of thick paint; this I laid on with a painter's bruſh. After it had been applied about three hours, I patted it gently down with my hand, cloſe to the tree. By ſo doing I get red of all the air bubbles that may be under the compoſition, and make it adhere to the tree, preventing it from being waſhed off by heavy rains.

In the beginning of Auguſt, (ſame ſeaſon in America,) we ſhorten the fore-right ſhoots to about four inches long ;by this time, the ſhoot will have made its full growthfor the ſeaſon, and will produce fine ſtrong eyes for thefollowing year.

The tree above mentioned had a decayed rotten root, the dead part of which I cut all away till I came to the ſound wood. Whenever the trunk is hollow, you muſt follow it under ground till you have cut out all the decayed parts and rotten roots ; otherwiſe you will loſe the tree.

By proceeding according to the foregoing directions, the root will be renewed, while the tree is forming a fine handſome head.

If the above directions be followed, you will get more pears in three or four years than you can in twenty-five years by planting young trees, and pruning and managing them in the common way.

The depth of the mould for pear-trees ſhould never be leſs than three feet, laying the beſt mould a top, to encourage the roots to come as near the ſurface as poſſible. If the bottom be clay it will be neceſſary, once in every five or ſix years, to open the ground round the roots of the trees, and cut off all the large ones that are inclining to run into the clay; by ſo doing your trees will throw out freſh roots that will run near the ſurface, provided the mould is good near the top.

THE ORCHARD.

That ſoil which produces good crops of corn, graſs, or garden vegetables, will alſo do for an orchard; but a loamy ſoil is to be preferred; though any of a good quality, not too light or dry, nor wet, heavy or ſtubborn, but of a moderately ſoft and pliant nature, will be found to anſwer the end. Shingly and gravelly ſoils diſagree very much with fruit trees, unleſs there be loam intermixed. If the bottom be clay the roots ſhould be cut once in four years, to prevent them from penetrating the clay, which would greatly injure the trees. The ſoil ſhould be two or three feet deep; before planting the trees it ſhould be trenched two ſpits deep, and ten feet broad, where the rows are to be planted, and a ſpit below looſened, unleſs it be clay, which ſhould be trodden down. If it be paſture ground it ſhould be ploughed and well ſummer-fallowed, till the graſs be killed, otherwiſe, when it is laid in the bottom in trenching, which it generally is, it will be very apt to breed grubs, which will do much miſchief.

Some only dig holes large enough to receive the roots, eſpecially in graſs ground which is to be continued ſo. Others prepare the ground by deep ploughing, if the orchard is to be of great extent. The ſward, if paſture, ſhould be ploughed ſome time in ſpring; give it a good ſummer-fallow, ploughing it two or three times, which will rot the turf. A fortnight or three weeks before planting, give the ground a good deep ploughing

ploughing to prepare it for the reception of the trees. The beſt time for planting on a dry ſoil is in October; but if wet, the latter end of February or the month of March will be a fitter ſeaſon.

In planting, endeavour to ſuit the trees as well as poſſible to the ſoil, and to plant them at proper diſtances from each other; which may be from forty to eighty feet, according to the ſize of the trees when full grown. Fruit trees, as has already been obſerved, when planted too thick, are very liable to blights, and to be covered with moſs, which robs the tree of a great part of its nouriſhment, beſides ſpoiling the flavour of the fruit. Procure your trees from a ſoil nearly ſimilar to, or rather worſe than that where you intend to plant them; for trees tranſplanted from a rich ſoil to a poorer, never thrive well, but if from a poor to a richer ſoil, they will generally ſucceed.

Ploughing or digging the ground, provided it be not done ſo deep as to hurt the roots, by admitting the ſun and rain to meliorate the ground, will keep the trees in a healthy flouriſhing ſtate. It will be neceſſary to ſupport the young trees by tying them to ſtakes until they are well rooted, to prevent their being looſened, or blown down by the wind. The ſpring after planting, if it prove dry, dig up ſome turf, and lay it round the ſtem of the young trees with the graſſy ſide downwards; this will keep the ground moiſt, and ſave a deal of watering. If the trees have taken well this need not be repeated, as they will be out of danger the firſt year. The turf ſhould be laid as far as you think the roots of the trees extend, and when it is rotted, it ſhould be dug in, which will be of great ſervice to them.

Orchards ſhould be dunged once in two or three years. The ſtems of trees in thoſe where cattle feed, ſhould be high enough to prevent their eating the lower branches, and fenced in ſuch a manner as to prevent their being barked, or injured by the cattle rubbing againſt them, particularly when young, which may be done by triangles of wood, or the trees may be buſhed with thorns, &c.

Burning of rotten wood, weeds, potatoe haulm, wet ſtraw, &c. on the windward ſide of the trees when they are in bloſſom, will be found a good preſervative from blights, caterpillars, &c.

I would recommend waſhing the trees annually in the month of February or March, with the following mixture, which will deſtroy the eggs of inſects and prevent moſs from growing on the trunks and branches. It will alſo help to nouriſh the tree, keeping the bark fine and healthy ; and will have the ſame effect on it as a top dreſſing has upon graſs land.

Mix freſh cow dung with urine and ſoap ſuds, and with this mixture waſh over the ſtems and branches of the trees, as a white waſher would waſh the cieling or walls of a room ; taking care to cut off all cankery parts, and to ſcrape off all the moſs, before you lay the mixture on. In the courſe of the ſpring or ſummer, you will ſee a fine new bark coming on. When the old bark is cankery, you muſt pare it off with a drawing knife.

When you ſee it neceſſary to take all the outer bark off you muſt cover the ſtem, &c. with the compoſition and powder, patting it gently down, as in the caſe when large limbs are cut off.

If the above waſh be repeated in autumn after the fall of the leaf, it will deſtroy the eggs of a great many inſects that hatch in autumn and winter. This waſhing will be found of great ſervice to all kinds of fruit and foreſt trees whatever.

OF GATHERING APPLES AND PEARS.

As apples, ſhaken or beaten down with a pole, never keep in winter, they ought all to be hand-picked, by a perſon ſtanding on ſteps made on purpoſe.

The ſteps ſhould be light, for convenience of moving from one place to another, and ſo contrived that the ladder may be diſengaged from the back at pleaſure, which may eaſily be done if they are faſtened together by a bolt a-top. There ſhould be a broad ſtep a-top to ſtand on, with room for the baſket which is to hold the fruit. When you begin to gather the fruit, you ſhould be provided with hand baſkets of different ſizes, and alſo with large baſkets, or hampers, and wheel-barrows. You muſt lay ſome ſhort graſs mowings, perfectly dry, (which you ought to provide for the purpoſe in ſummer, and keep in a ſhed or any other dry place till wanted,) at the bottom of the large baſkets and hampers, to prevent the fruit from being bruiſed.

Obſerve attentively when the apples and pears are ripe; and do not pick them always at the ſame regular time of the year, as is the practice with many. A dry ſeaſon will forward the ripening of fruit, and a wet one retard it; ſo that there will be a month or five weeks difference in the proper time of gathering.

If the foregoing obſervations are attended to, the fruit will keep well, and be plump, and not ſhrivelled, as is the caſe with all fruit that is gathered before it is ripe.

The perſon on the ſteps ſhould pick the fruit carefully, and lay it gently into the baſket on the top of the ſteps; for if it be in the leaſt bruiſed it will not keep. For the ſame reaſon great care muſt be taken in emptying the fruit out of the hand-baſket, when full, into the large baſkets or hampers. If more than one large baſket be wheeled at once, which may be generally done, the lower ones muſt not be ſo full as to let the bottom of the upper one touch the fruit. It will alſo, be neceſſary to put ſome of the ſoft dry graſs between the baſkets, and alſo over the fruit in the upper baſket.

When the fruit is carried to the fruit-room, lay ſome of the dry ſhort graſs on the floor in the area of the room; then take the fruit gently out of the baſkets, and lay it in heaps on the top of the graſs, keeping each ſort in a ſeparate heap; the heaps may be from two to three feet high, or according to the quantity of fruit that you have. When the heaps are completed, cover the tops at leaſt two inches thick with ſhort graſs, in order to ſweat them. Let them lie a fortnight, then open the heaps and turn them over, wiping each apple or pear with a dry woolen cloth, which ſhould be frequently dried during the proceſs, obſerving now to lay in the middle the fruit which was at top. Let the heaps now remain eight or ten days, covered as before; by that time they will have thrown out the watery crudities, which they may have imbibed during a wet ſeaſon; then uncover the heaps, and wipe the fruit carefully, one by one, as before, picking out every one that is injured, or has the leaſt ſpot, as unfit for keeping.

Fruit ſhould be gathered, if poſſible, in dry weather, and when the dew is exhaled from off the trees; and remember never to gather in the evening after the dew begins to fall.

During the time that the fruit is ſweating, the windows ſhould be left open, except in wet and foggy weather, to admit the air to carry off the moiſture, which perſpires from the fruit. The perſpiration will ſometimes be ſo great, that on putting your hand into the heap, it will come out as wet as if it had been dipped into a pail of water. When in this ſtate, it will be neceſſary to turn and wipe the fruit.

I would, therefore, recommend covering the bottoms of the ſhelves with thin coarſe canvas, on which the fruit ſhould be laid in a ſingle layer, after being wiped perfectly dry; but by no means lay them a-top of one another. When that is done cover them with a piece of the ſame canvas, or thin flannel or with old newſpapers, or whitiſh brown paper, which will, in a great meaſure, exclude the air, prevent the froſt from injuring the fruit, and preſerve a beautiful ſmoothneſs on its ſkin. The fruit ſhould be turned two or three times during the winter; as delicate and tender fruit, by being long without turning, is apt to rot on the underſide, even if perfectly ſound when laid up. Be particularly careful, however, to pick out all the damaged fruit.

Thoſe who keep their fruit in ſtore-houſes, for the ſupply of markets, as well as thoſe who have not proper fruit-rooms, may keep their apples and pears in baſkets or hampers, putting ſome ſoft paper in the bottoms and round the edges of the baſkets, &c. to keep the fruit from being bruiſed; then put in a layer of fruit, and over that another layer of paper; and ſo on a layer of fruit and of paper, alternately, till the baſket or hamper be full. Cover the top with paper three or four times double, to exclude the air and froſt as much as poſſible. Every different ſort of fruit ſhould be packed ſeparately; and it will be proper to fix a label to each baſket or hamper, with the name of the fruit that it contains, and the time of its being fit for uſe.

But the beſt way of keeping fruit is to pack it in glazed earthen jars. The pears and apples muſt be ſeparately wrapped up in ſoft paper, then put a little well dried bran in the bottom of the jar, and over the bran a layer of fruit, then a little more bran to fill up the interſtices between the fruit, and to cover it, and ſo on a layer of fruit and of bran, alternately, till the jar be full; then ſhake it gently, which will make the fruit and bran ſink a little; fill up the vacancy at top with more bran, and lay ſome paper over it, covering the top with a piece of bladder to exclude the air; then put on the top or cover of the jar, obſerving that it fits as cloſe as poſſible. Theſe jars ſhould be kept in a room where you can have a fire in wet or damp weather.

OF THE CANKER AND GUM.

The canker is a diſeaſe incident to trees, which occaſions the bark to grow rough and ſcabby, and turns the wood affected to a ruſty brown colour. This diſeaſe, if no remedy be applied, will in time totally kill the tree.

Apple trees are very liable to be infected with the canker from the following cauſes, *viz.*

From injudicious pruning, from the foot-ſtalks of the fruit being left on the trees, and from injuries ſuſtained by applying ladders in gathering the fruit; theſe injuries are very hurtful to the tree, and will infallibly bring on the canker when no remedy is applied.

Careleſs people frequently leave the dead ſhoots on the tree throughout the ſummer, which will infallibly bring on the canker. Some even leave them for years, until the tree is totally killed. They ſhould be cut off in the end of April or beginning of May; as, by that time, you will be able to ſee how far the diſeaſe has advanced. I would adviſe to cut two or three buds, or even more, below the apparently diſeaſed part, as the canker frequently reaches a great way farther in the heart of the ſhoot than it appears to do on the outſide; you muſt cut down till the brown colour in the ſhoot diſappears, and nothing remains but ſound white wood.

The truth of the foregoing obſervations will appear evident to any perſon, who takes notice of the apple-trees with their mutilated ſtag-looking heads, as he rides or walks along the road.

It is a general opinion, that the canker, in all trees, proceeds from the nature of the ground in which they are planted; ſuch as a ſour clay, a ſhingly or gravelly ſoil, &c.

The canker, as before obſerved, proceeds from bruiſes in the bark, from limbs cut off, &c. When theſe limbs begin to rot and grow hollow, they convey the canker to the root; for it always proceeds from the branches and ſtem to the roots, and never from the roots to the tree.

It is granted, however, that all fruit-trees love a fine rich mellow loam, and thrive much better in it than in a ſhingly or gravelly ſoil.

When, by accident or improper treatment, trees receive large wounds, and the cure is left to nature, they are frequently overrun with gum and canker, which, if not checked, will, in a ſhort time totally ruin them.

In this caſe, you muſt carefully pare off, with a draw-knife, or any other convenient inſtrument, all the diſeaſed part of the bark. The inner white bark is frequently infected; this muſt alſo be cut away, till no appearance of infection remains. The infection in the inner bark appears like dots made with a pen; all of which muſt be cut clean out; for if any part of the canker be left, it will infect the new wood and bark. Wherever you ſee gum oozing out, you muſt reſt aſſured that the canker is not quite eradicated; which, if ſuffered to remain, will ſpread, till the whole tree becomes a maſs of gum and canker, and will be killed in a very ſhort time.

When the trunk is become hollow, cut the looſe rotten part clean out, till you come to the ſound wood, taking care to round the edges of the hollow part; then apply the compoſition in a liquid ſtate, laying it on with a painter's bruſh, wherever the cankered bark has been pared off, or the dead wood cut out, till theſe places are entirely covered with it. When that is done, ſhake ſome of the powder of wood aſhes and burnt bones over the compoſition, and pat it gently down with your hand.

If the foregoing directions be carefully followed, the canker will be completely eradicated, and the hollow trunk in time be filled up with ſound wood.

When the ſtem is much decayed, it will be abſolutely neceſſary to open the ground, examine the roots, and cut off all the rotten parts. When you have cut out all the rotten and decayed parts below ground, and ſcraped the hollow clean, make up a maſs of the compoſition, mixed with ſome clay, like what is uſed for grafting, then fill the hollow part with it to within two inches of the ſurface of the ground, treading it in with your own foot, or preſſing it with the hand, as cloſe as you poſſibly can, to prevent the wet from penetrating to the roots, and leave the ſurface of the compoſition ſloping from the tree towards the outſide of the border, to throw the wet off, which will prevent the freſh part of the root from rotting; then cover the root over with mould level with the reſt of the border,

When you have examined all the old wounds, where large limbs have been cut off, you ſhould next examine the old bark; and if you find the outſide of it wrinkled and cracked, pare it off; as it is always, when in that ſtate, very much hurt by the canker. This ſhould be done with the draw-knife, or other ſharp inſtrument; then apply the compoſition as before directed, which will bring on a fine ſmooth bark under it. In the ſucceeding winter or ſpring you will ſee all the plaiſter, with the old part of the bark that was left in the hollow parts of the tree, or where old branches had been amputated, peeling off, and ſhewing the ſmooth bark underneath. You ſhould then ſcrape off, with a wooden or bone knife, what old bark remains in the hollows, where the draw-knife could not reach without cutting too much away. When that is done, mix up ſome freſh cow-dung with ſoap-ſuds and urine, making it very thin, and give the tree a coat of this mixture all over where the bark has been ſcraped off. The cow-dung will adhere to it, and heal the parts where you were obliged to ſcrape to the inner bark. This waſh will remain till the freſh bark comes on; then it will be diſcharged of itſelf during the ſummer or next ſpring, leaving a new freſh ſmooth bark, where the old and cankery bark was taken off. Next ſpring, if any of the old bark remains, you may repeat the ſame operation, which will cauſe all the remaining old bark to ſlough off like a ſcab from a wound on the human body.

By theſe means you will keep your trees in a fine flouriſhing healthy ſtate, and in general prevent them from becoming bark-bound. If any of them, notwithſtanding, ſhould be bark-bound, you muſt ſcarify them, by taking a ſharp knife, and running the point of it ſtraight down the middle of the ſtem from top to bottom; taking care to run your knife thro' the outer bark only; then with your bruſh, or your finger, rub in ſome of the compoſition, to prevent the inciſion from bringing on the canker. This operation will cauſe the tree to expand the bark, and become very flouriſhing.

Remember to cut off all the ends of the ſmall ſhoots, where the canker had injured them laſt year. Cut off, alſo, the old fruit ſtalks, and all the ſmall dead ſtubs, which, if left, will never fail to bring on the canker.

It is much to be regretted, that fruit trees in general are in a mutilated, unfruitful ſtate. After gentlemen have purchaſed young trees from nurſeries, and planted them in their orchards and gardens, they think every thing neceſſary is done, when, in fact, the greater part of the work is yet to come. In packing and carriage, the ſtems and branches are very frequently bruiſed; in that caſe, the injured parts of the bark and wood muſt be carefully cut out, and the compoſition immediately applied. This may be done when you head the trees, which operation ſhould be performed in April, May, or even June, when the bud begins to ſhoot; but by no means cut off any of the ſhoots, except thoſe that are bruiſed or broken very much. When this is neglected, the canker will follow, to the great injury, if not the death of the trees. How common is it to ſee, in all parts of the country, great numbers of trees ſo affected with this diſeaſe, as not to produce fruit enough in twelve or fourteen years to pay half the expenſe attending them! Whereas, if they were to be managed according to the foregoing directions, they would more than pay all the expenſe in three years. It is common, when young trees do not thrive, either to blame the nurſery men for ſending bad or diſeaſed trees, or to attribute their unthriving ſtate to the nature of the ſoil; whereas the fact is, that this frequently ariſes from the inattention or miſmanagement of the perſon who plants and ſuperintends them. If the injured and diſeaſed parts be not cut out at an early period, the trees will not thrive, but will become cankery and ſtunted, and cannot be recovered afterwards without a great deal of labor and trouble; whereas if the directions given for heading trees the firſt year, and cutting out the diſeaſed parts, be attended to, the trees will flouriſh, and bear large crops of fine and well-flavored fruit.

THE GUM.

The gum is a kind of gangrene, incident to fruit trees of the ſtone kind, and ariſes from the following cauſes. From injudicious pruning, from bruiſes, or any injuries received in the wood or bark. It may alſo, be occaſioned by leaving the foot-ſtalks of the fruit, or by pruning in ſummer, and cutting the ſhoots to ſhort ſtumps, and by injuries ſuſtained by a careleſs application of ladders, &c. but it particularly originates where large limbs have been lopped or broken off. This diſeaſe may be known before the gum itſelf makes its appearance. The bark, at firſt, becomes of a browniſh colour, which gradually grows darker, till, at laſt, the gum begins to ooze out like little bliſters. As ſoon as any of theſe ſymptoms are obſerved, the infected part ſhould be cut out with a ſharp inſtrument, and the compoſition and powder applied immediately. You muſt obſerve to cut out the gum perfectly clean; you will ſee it oozing out from between the wood and bark. This muſt be followed till you come to the white clean bark and wood. If afterward any gum ſhould make its appearance, it muſt be ſcraped off; which is beſt done when it is moiſtened with rain, as you can then ſcrape it off eaſily without hurting the bark. This muſt be done without delay, otherwiſe the diſeaſe will rapidly advance.

When trees are hollow, it will be neceſſary to examine them carefully to ſee whether any grubs have entered the bark and wood, which you will know by their perforating the bark. If there be any, they muſt be carefully cut out, before the compoſition is applied.

All trees that bear ſtone fruit are liable to emit a gum, which, by producing a canker, proves fatal to the health and vegetation of the tree. Moſt foreſt trees are alſo liable to what is called a bleeding, which proceeds from any injuries that obſtruct the circulation of the juices. Of thoſe that ſuffer from bad management or accidents, ſome are injured by unſkilful pruning and lopping at improper ſeaſons of the year, and others by the violence of high winds, having boughs or limbs torn from their bodies, which, being left in that ſtate, expoſed to hard froſts, are often cracked or rent in the wood; or from heavy and ſoaking rains, the wounds imbibe ſo large a quantity of wet and moiſture as, by cauſing a fermentation with the natural juices, brings on diſeaſe, and in time deſtroys the health and vegetation of the tree. Theſe, among other cauſes, tend to produce decay and barrenneſs in fruit trees, as well as defects in timber, to the great loſs of the public in general, as well as eſſential injury to the individual proprietor.

To remove theſe evils, and to prevent the ill-conſequence ariſing from the cauſes already deſcribed, I ſubmit to the experience of the public a remedy diſcovered by myſelf, which has been applied with never-failing ſucceſs to all kinds of fruit-trees, and has not only prevented further decay, but actually reſtored vegetation and increaſed fruitfulneſs, even in ſuch as were apparently barren and decayed. It has produced alſo ſimilar effects on foreſt-trees, by reſtoring them to ſoundneſs of timber and healthful vegetation, and covering, as it were, viſible nakedneſs and increaſing decay with freſh and vigorous foliage.

This remedy is a compoſition formerly applied in the manner of a plaſter, but now in a liquid ſtate, and laid over the wounded or injured part of the tree with a painter's bruſh. It is of a ſoft and healing nature; poſſeſſes an abſorbent and adheſive quality; and by reſiſting the force of waſhing rains, the contraction of nipping froſts, and the effects of a warm ſun or drying winds, excludes the pernicious influence of a changeable atmoſphere.

The diſcovery of it is the reſult of much reflection and ſtudy, during a long courſe of years, and of a great variety of experiments made, at a very conſiderable expenſe, to aſcertain the efficacious power of the application. Nor ſhall I heſitate a moment to declare my firm belief, that wherever it ſhall be properly applied, by proprietors of gardens, orchards and woods, it will be productive of all the advantage that can be derived from reſtoring, as well as preſerving vigor and fertility in all kinds of fruit trees; as alſo from preventing decay, and promoting health and ſound timber in every ſpecies of foreſt trees; and how great that advantage may be, it is in the capacity of every one to determine.

As I feel a ſtrong ſolicitude to render my experiments of the moſt extenſive advantage to the community, and in particular to the proprietors of landed eſtates, I beg leave to recommend to their particular attention, that all foreſt trees, whether felled with a ſaw or an axe, may be cut near the ground, at the ſame time carefully preſerving the ſtump and roots from any farther injury. The ſurface ſhould then be made quite ſmooth, when the compoſition may be ſpread over the whole ſurface according to the direction, already given. It ſhould, however, be obſerved, that the compoſition, when employed for this particular purpoſe, ſhould have an equal quantity of the powder of alabaſter or plaiſter Paris mixed with the dry powder generally directed to be uſed after the compoſition is laid on, in order to render the ſurface harder, and, of courſe, better able to reſiſt the bad effects of the dripping of trees, of rain, froſt and ſnow. But this addition is by no means neceſſary in the uſual application to the ſides of trees.

In conſequence of this proceſs, the vigour of the roots will operate ſo powerfully in the courſe of the ſucceeding ſpring, that a conſiderable number of buds or branches will ſhoot forth round the ſtump, which, with proper care and attention, may be trained to many valuable purpoſes, either ſtraight or crooked for knee-timber or other uſes; and by retaining only ſo many of theſe ſhoots, as are deſigned to grow for any particular intention, more than one half will be ſaved, in point of time according to the proportions of common growth; for if a young tree be planted in a ſoil equal in quality to the ſite of the old ſtump, the ſhoot growing from the latter will, in eight or ten years, attain to a ſize which the ſingle plant will hardly acquire in twice that period. There are alſo many uſeful purpoſes of huſbandry, as hop-poles and other poles uſed on various occaſions, for which a number of ſhoots may be trained from one ſtump, whoſe fertile juices will ſhortly rear a healthy and numerous offspring around it. Very particular attention, however, ſhould be paid to regulate their number, according to the ſize and vigor of the ſtump. It would certainly be proper to leave more of them at firſt than are intended to be reſerved for final uſe, in order to draw up the ſap; if too few are left they will be liable to burſt, from the ſuper-abundant flow of the juices from the old ſtock: To prevent which inconvenience, they ſhould be cut away by degrees, always applying the compoſition as they are cut, and leaving the fineſt ſtem to produce the new tree, which will, in time cover the old ſtump, and leave nothing but a faint kind of cicatrix at the junction of the old and new part of the tree.

DIRECTIONS,

For making a compoſition for curing diſeaſes, defects, and injuries in all kinds of fruit and foreſt-trees, and the method of preparing the trees, and laying on the compoſition, by William Forsyth.

Take one buſhel of freſh cow-dung, half a buſhel of lime rubbiſh of old buildings (that from the ceilings of rooms is preferable,) half a buſhel of wood-aſhes, and a ſixteenth part of a buſhel of pit or river ſand. The three laſt articles are to be ſifted fine before they are mixed, then work them well together with a ſpade, and afterwards with a wooden beater, until the ſtuff is very ſmooth, like fine plaſter uſed for the ceilings of rooms.

The compoſition being thus made, care muſt be taken to prepare the tree properly for its application, by cutting away all the decayed, dead, and injured part, till you come to the freſh ſound wood, leaving the ſurface of the wood very ſmooth, and rounding off the edges of the bark with a draw-knife, or other inſtrument, perfectly ſmooth, which muſt be particularly attended to; then lay on the plaiſter about one eighth of an inch thick, all over the part where the wood or bark has been ſo cut away, finiſhing off the edges as thin as poſſible. Then take a quantity of dry powder, of wood aſhes mixed with a ſixth part of the ſame quantity of the aſhes of burnt bones, put it into a tin box with holes in the top, and ſhake the powder on the ſurface of the plaiſter till the whole is covered over with it, letting it remain for half an hour to abſorb the moiſture; then apply more powder, rubbing it on gently with the hand, and repeating the application of the powder, till the whole plaiſter becomes a dry, ſmooth ſurface.

All trees cut down near the ground ſhould have the ſurface made quite ſmooth, rounding it off in a ſmall degree, as before mentioned; and the dry powder directed to be uſed afterwards ſhould have an equal quantity of powder of alabaſter mixed with it, in order the better to reſiſt the dripping of trees and heavy rains.

If any of the compoſition be left for a future occaſion, it ſhould be kept in a tub, or other veſſel, and urine of any kind poured on it, ſo as to cover the ſurface, otherwiſe the atmoſphere will greatly hurt the efficacy of the application.

Where lime-rubbiſh of old buildings cannot be eaſily got, take pounded chalk or common lime, after having been ſlacked a month at leaſt.

As the growth of the tree will gradually affect the plaiſter, by raiſing up its edges next the bark, care ſhould be taken, where that happens, to rub it over with the finger when occaſion may require, (which is beſt done when moiſtened by rain,) that the plaiſter may be kept whole, to prevent the air and wet from penetrating into the wound.

WILLIAM FORSYTH.

To the foregoing directions, for making and applying the compoſition, it is neceſſary to add the following :

As the beſt way of uſing the compoſition is found by experience to be in a liquid ſtate, it muſt, therefore, be reduced to the conſiſtence of pretty thick paint, by mixing it up with a ſufficient quantity of urine and ſoap ſuds, and laid on with a painter's bruſh. The powder of wood-aſhes and burnt bones is to be applied as before directed, patting it down with the hand.

When trees have become hollow, you muſt ſcoop out all the rotten, looſe, and dead parts of the trunk till you come to the ſolid wood, leaving the ſurface ſmooth, then cover the hollow, and every part where the canker has been cut out or branches lopped off, with the compoſition, and as the edges grow, take care not to let the new wood come in contact with the dead, part of which it may be ſometimes neceſſary to leave ; but cut out the old dead wood as the new advances, keeping a hollow between them to allow the new wood room to extend itſelf, and thereby fill up the cavity, which it will do in time, ſo as to make as it were a new tree. If the cavity be large you may cut away as much at one operation as will be ſufficient for three years. But in this you are to be guided by the ſize of the wound and other circumſtances. When the new wood, advancing from both ſides of the wound, has almoſt met, cut off the bark from both edges, that the ſolid wood may join, which, if properly managed, it will do, leaving only a ſlight ſeam in the bark. If the tree be very much decayed, do not cut away all the dead wood at once, which would weaken the tree too much, if a ſtandard, and endanger its being blown down by the wind. It will therefore be neceſſary to leave part of the dead wood, at firſt, to ſtrengthen the tree, and to cut it out by degrees as the new wood is formed. If there be any canker or gum oozing, the infected parts muſt be pared off or cut out with a proper inſtrument. When the ſtem is very much decayed, and hollow, it will be neceſſary to open the ground and examine the roots, then proceed as directed for hollow peach trees.

RAISING OF VIRGINIA WHEAT.

An account of a ſucceſsful experiment in raiſing the early Virginia Wheat, and ſome obſervations on the uſe of the Plaiſter of Paris as a manure.

By Justin Ely, Eſq. of *Weſt Springfield.*

IN October, 1798, I purchaſed a ſmall piece of intervale land on the weſt banks of Connecticut river, in the general field in *Weſt Springfield.* It lay ſo high as not to be covered by the floods. The ſoil, a warm loam, mixed with a little fine ſand, and naturally of a good quality, but it had been exceedingly exhauſted by a long courſe of tillage (probably one hundred and fifty years) and by raiſing exhauſting crops, viz Indian corn, buck wheat, &c. with very little if any manure; by this practice it was reduced ſo low as to produce very poor crops.—In 1799, three acres and twenty-five rods, being the northwardly ſide of the ſaid land, were ſown with oats and red clover and herds graſs ſeeds. The crop was very indifferent. After the oats were harveſted, a ſevere drought followed, which entirely deſtroyed the young herds graſs, but the red clover moſtly ſurvived it.—Since I have owned the above land, the plaiſter of Paris, at the rate of one buſhel to the acre, has been annually ſown thereon, ſometimes in the ſpring, and ſometimes late in the fall. In the fall and winter of 1799 I procured a ſmall quantity of yard manure to be ſpread thereon, probably not more than ſix or eight loads to the acre. In 1800 and 1801, it produced good crops of red-clover hay from two tons, to two tons and an half to the acre. On the 21ſt day of Auguſt, 1801, the land was ploughed a little deeper than common, and the clover ſward was turned under. After a few days it was harrowed down by two horſes with a ſeed harrow, in the ſame direction it had been ploughed; then the land was again ploughed by two horſes in a day, with a ſmall plough (ſuch as is uſed to plough indian corn) but ſo ſhallow as not to diſturb the turf which had been turned under.

On the 21ſt day of September, 1801, the land was ſown with three buſhels of early Virginia ſeed wheat, which had been firſt ſoaked thirty-ſix hours in water. The water was then drained off, and the wheat was taken out, about half a buſhel at a time, and ſpread in a half hogſhead; then four or five quarts of ground plaiſter of Paris were ſpread thereon, then about three quarts of herds graſs ſeed, and one pint of red clover ſeed was ſpread over the plaiſter, and then the whole was ſtirred and well mixed together—the remainder of the ſeed was prepared in the ſame manner, and then ſown the ſame day while the wheat was ſtill wet, and the fine plaiſter ſtill covering the ſurface of every kernel. If ſuffered to remain a few hours after the application of the plaiſter, the wheat will become ſo dry that the plaiſter will not adhere to it.—The ſeed was then lightly ploughed in with a ſmall plough drawn by one horſe only. The ground was then harrowed croſsways of the furrows to make the ſurface even for mowing.

The mixing the plaiſter with the grain, when ſown as above mentioned, cauſes it to come up ſooner. The firſt ſhooting of the blade appears ſtronger, and of a darker colour, and comes on faſter, than it otherwiſe would do.

On the 22d day of November following, three buſhels of plaiſter of Paris were ſown on the ground. If ſown with the grain, or very ſoon after, it will bring forward the graſs ſo rapidly as to injure the crop, and ſometimes to choak and deſtroy it; but if no graſs ſeed is ſown with the grain, the plaiſter may be ſown at the ſame time or ſoon after. Some ſow it on their winter grain the next ſpring, but the fall is preferred.

The appearance of the crop of wheat did not promiſe any thing extraordinary in the fall, nor till a month before harveſt, at which time I would gladly have parted with the crop, for one half of what it yielded at harveſt. It ripened ſo early as to be harveſted a few days ſooner than any crop of rye in the vicinity ;—to this circumſtance of its ripening thus early before the nights get to be warm, is imputed the ſecurity of this kind of wheat from blaſting.

The produce of the above crop was one hundred and eleven buſhels of good plump berried wheat, the average weight whereof was ſixty-four pounds to the buſhel. Beſides ſome buſhels of foul grain for horſe provender—about ninety-five buſhels of the above wheat have been diſpoſed of for ſeed at one dollar and an half for a buſhel.

The graſs ſeed ſown with the wheat ſucceeded well, and at this time appears more promiſing, than any I ever had before.

The ſowing the graſs ſeed, mixed with the grain and plaiſter, ſaves the trouble of ſowing and harrowing it, in the common way ; and by being thus lightly ploughed in, the ſeeds are covered at different depths in the earth, and are more ſure of ſucceeding, (eſpecially in a dry ſeaſon) than when ſown on the ſurface, or but thinly covered, as is commonly done

The above was a larger produce of wheat, than is recollected to have been ever raiſed in the vicinity, being about thirty-ſix buſhels to the acre. A ſingle acre of the beſt undoubtedly yielded more than forty buſhels.

The land was made mellow and well-fitted for the crop, but the uncommon produce was undoubtedly owing to the application of the plaiſter of Paris with the ſmall quantity of manure put on the land. The quantity of yard manure was inſufficient to give the whole of the land a very thin light dreſſing ; therefore, ſome of the hollows and beſt of the land had no yard manure put thereon, but had the uſual annual ſupply of plaiſter, in thoſe places the crop was very indifferent, and the land did not produce more than one quarter as much wheat as grew on the land adjoining, which had been manured.

The ſowing one buſhel of plaiſter to the acre annually, cauſes our lands to produce very abundant crops of graſs, where very little would grow without it—this ſucceeds better than ſowing four or five buſhels to the acre once in three or four years.

When the land is ploughed up where the plaiſter has been applied, it turns up lively and mellow. When laid down to graſs, two crops, or at moſt but three crops, are taken, the ſward is then ploughed in, and one or two crops are taken of Engliſh grain, flax, indian corn, potatoes or buck-wheat, the plaiſter is ſucceſsfully applied to each of theſe crops, and the land is then again laid down to graſs.

By this rotation of crops the lands are improved, and continue to produce larger crops. Whether the ſame courſe of tillage will ſucceed in other parts of the country can be determined only by experience.

Judge Peters, in his treatiſe on the uſe of the plaiſter of Paris, in a note which is paſted in at the end of ſome of the books, but is omitted in others, obſerves, that the plaiſter will not be productive in the vicinity of the ſalt water, and that the marine ſalts prevent its operation. As I have not the book before me, I cannot quote his words, but I think the ſenſe is as above expreſſed. Experience ſhews the juſtneſs of the obſervation, for near the ſalt water the plaiſter is ſaid to produce no beneficial effects. The greater the diſtance from the ſalt water, the greater is ſaid to be the efficacy of the plaiſter. It is carried from Philadelphia in waggons acroſs the Alleghany mountains two hundred and fifty miles into the country, with ſucceſs.

Cattle in the vicinity of the ſalt water, require no ſalt in the ſummer ſeaſon ; at ſome diſtance they require a little, and it is ſaid their conſumption of ſalt is in proportion to their diſtance from the ſalt water.

Is it not poſſible this may be a criterion whereby to determine whether the application of plaiſter of Paris to lands will be beneficial ?

If near the ſea, where cattle require no ſalt in the ſummer, the quantity of ſalt deſcending in dews or otherwiſe, is ſo great as to prevent the efficacy of the plaiſter ; the fact will be of great utility to be known, as thereby many people may ſave themſelves the trouble and expence of fruitleſs applications of the plaiſter, and the mortification of diſappointments. This will alſo reconcile the different and contradictory accounts received from different parts of the country, of the utility and efficacy of the plaiſter.

Weſt Springfield is at the diſtance of fifty or ſixty miles from the ſea. Here the plaiſter ſucceeds on all our lands, except thoſe that are occaſionally flooded by the ſtreams. Yet farther inland to the weſtward and northward it is ſaid to anſwer ſtill better. It accelerates the growth of fruit trees. One or two hands full ſhould be ſprinkled around each tree annually ; this will make them thrifty and fruitful.

Some people practice ſpreading a very thin covering of their lighteſt yard manure on their mowing lands, and then ſow thereon a buſhel of plaiſter to the acre. The produce of the manure and plaiſter thus united is thought to anſwer better, than when they are applied ſeparately. That ſeemed to be the caſe with the crop of wheat abovementioned.

Where the plaiſter has been ſown, the dews fall more copiouſly in the night, and continue on much longer the next day. The cattle prefer the graſs and hay where the plaiſter has been ſown.

Where yard manure, conſiſting moſtly of ſtraw and hay, not ſufficiently rotten, is ſpread on mowing land, the application of a buſhel of plaiſter to the acre ſown thereon, will ſoon rot the ſtraw and hay, ſo as to convert them into good manure, by which the quantity of graſs is increaſed and the mowing is facilitated.

The ſouthwardly part of the above lot has been ſown annually with plaiſter in the ſame manner as the north ſide, but had no yard manure applied, till two years after it had been put on the other ſide of the lot. In 1799 it was planted with corn and potatoes. The ſummer was very dry and the crop very poor. On the 25th day of October, 1799, three buſhels and an half of early Virginia ſeed-wheat were ſown on the land abovementioned, being about three acres and an half, after the crop of corn and potatoes were gathered. Herds graſs and clover ſeed were ſown with the wheat; the ſeed was ploughed in with a ſmall plough by one horſe. The produce was but ſeven buſhels of merchantable wheat, with a few buſhels more ſo foul as to be uſed for horſe provender. The very ſmall crop ſhews the extreme poverty of the land, and how much it was reduced by bad management. After the wheat had been gathered in the fall and winter of 1800, ſix or eight loads of barn-yard manure were ſpread on each acre; the produce ſince has been about two tons to the acre of herds graſs and clover hay.

CULTURE OF POTATOES.

PLEASANT HILL, JAN. 1, 1803.

IN the ſpring of the laſt year, I found in the ground a large *Iriſh apple potatoe*, which had lain there all the winter. This potatoe contained twelve eyes, which I carefully ſeparated, and planted in four hills in my garden, three eyes in each hill. I dunged the hills well with horſe dung that had rotted in the hot-bed the laſt ſeaſon; from theſe four hills, I gathered *two hundred and thirty-two potatoes*; *two hundred and ten* of them were fit for the pot, and *one hundred* of the largeſt weighed *thirty-four pounds.* The core of this potatoe, *without either ſkin or eye,* I cut into ſix pieces, and planted in one hill; from this I gathered *twenty-two potatoes,* all very ſmall, none bigger than a large cramberry; ſo that the whole produce was *two hundred and fifty-four.* It is remarkable, *all the potatoes that were from the core, were of the true Iriſh apple kind,* and *all that were from the eyes, were of a kind very much like the Engliſh whites.*

It ſhould be remarked, that the Iriſh apple potatoe *is not a great bearer,* and that the paſt ſeaſon was not favorable to potatoes.

Mem. The whole produce of this potatoe, I have preſerved, and mean, the next ſeaſon, to give it a fair trial, and notice the produce of the whole.

I have, for ſeveral years, made experiments on potatoes (ſome of which I communicated to the ſociety) and from them I am fully convinced, that *ſmall* potatoes are as good for ſeed as *large,* that *three in a hill* are better than a larger quantity, that *cut potatoes* are better than *whole,* and that the *eyes* are beſt of all.

The paſt ſeaſon I planted my potatoe fields chiefly with eyes, and had, *in ſome parts, a prodigious increaſe;* and in the field throughout, full as large a crop as any of my neighbors, although they planted from *eight to ten buſhels on an acre;* and I planted a *ſhort half buſhel on an acre,* and if I had cut the eyes carefully, I am ſure there would not have been a *peck to an acre.* In this method there will be an immenſe ſaving of more than *nineteen twentieths of the ſeed,* which is well worth the attention of every farmer who dares to differ from the practice of his father.—My overſeer wanting faith in this method, planted a ſingle large potatoe with many eyes in a hill by itſelf; he gave it three times as much dung as any other hill, and it produced only *thirty-four potatoes of all ſizes,*

I am &c.

JOSEPH BARRELL.

THE BENEFIT OF FREQUENT PLOUGHINGS.

HAVING been engaged, for ſeveral years, in making improvements, by mixing ſoils, and increaſing the quantity of manure on my farm, I was determined, the laſt year, to make a trial of improving land by repeated ploughings. For this purpoſe I ſelected the pooreſt piece of ground I had on my farm, with the intention of ploughing it immediately after every rain, falling in a quantity ſufficient to penetrate tolerably into the ground. In one part of my farm I had between one third and half an acre of land of extremely poor, thin, loamy ſoil, intermixed with looſe gravel. It was on a riſe of ground ſurrounded with better land, in a lot I improved for mowing. This piece of land, with that which ſurrounded it, had been often ploughed, planted with Indian corn, and ſowed with different kinds of grain, but this particular part had never produced a crop ſufficient to pay the expence of cultivation. For ſix or ſeven years it had been laid down, but had acquired ſcarcely any kind of ſord or graſs worth mowing. In the courſe of the ſummer of 1800 it was ploughed after every conſiderable rain that fell, except one, (about the 20th of June,) either on the ſame or the day following, viz. on May 16th, June 2d, July 20th, Aug. 5th, Aug. 20th, and Sept. 9th. It was ploughed pretty deep with two pair of oxen, croſſing the furrows at each ploughing. Scarce any kind of vegetable came up in the intervals of ploughing. A narrow ſtrip on one ſide the piece I deſignedly omitted to plough at the 2d, 3d, and 5th times of ploughing. On the 9th of Nov. (the laſt day of ploughing,) I ploughed up another narrow ſtrip on another ſide which I had not ploughed before, and on the ſame day I ſowed the whole with twelve quarts of winter rye. It came up in a ſhort time, appeared much a like on the ground which had been differently ploughed, and attained a conſiderable growth before the froſt ſet in. In the courſe of the ſummer the growth was very apparently different on the ground more or leſs ploughed. When it became fit to reap, the rye on the ſtrip ploughed only at the time of ſowing, was low, thin, with very ſhort heads, and not worth reaping. On the other ſtrip, ploughed three times, it was much better, but was conſiderably poorer than on the ground which had the greateſt number of ploughings. On the part which had been ploughed ſix times, the rye was large and tall, with long heads, and a full kernel, and much better grain than I had ever raiſed on any part of my farm. The twelve quarts of rye ſowed on all the ground produced five buſhels and thirteen quarts. By comparing the portion of the part ploughed ſix times with the two ſtrips, I judged that it produced at the rate of eighteen or twenty buſhels to the acre.

A. C.

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SOME ACCOUNT OF THE SPANISH SHEEP,

Communicated to the Maſſachuſetts Society for Promoting Agriculture,

By the Hon. David Humphreys.

"THE importance of meliorating the breed of Sheep in our country, particularly in the article of wool, had been early and deeply impreſſed on my mind.—In addition to the gradual proceſs of improvement, by beſtowing more care and attention on our native flocks, in feeding them well, and croſſing the blood, (obviouſly ſuggeſted by reaſon and experience,) two modes occured for haſtening and enſuring the attainment of that intereſting object. The firſt, to introduce and propagate an entirely new race, if a more perfect one could be obtained; the ſecond, to meliorate our ſtock by producing a mixed progeny from our ordinary ewes by rams of a better breed."

"But before there could be ſufficiently good reaſon for juſtifying the trouble and expenſe of tranſporting an adequate number, it was the part of wiſdom to aſcertain, firſt, whether the breed be ſuperior in intrinſic value to thoſe which already exiſted? And, in that caſe, ſecondly, whether the race contemplated to be introduced is likely, when propagated there, to retain all thoſe qualities which conſtituted the original ſuperiority of value? And here I founded my opinion in the affirmative of both queſtions, as applied to a particular kind of Spaniſh ſheep, on the facts ſtated, in ſome inſtances, by reſpectable individuals, and, in others, by official reports.

"In *Spain*, two diſtinct ſpecies of Sheep have for ages exiſted, the one named MERINOS, famous for their ſhort and fine wool, peculiarly fit for carding; the other denominated CHURROS, diſtinguiſhed for their long and coarſe wool, more ſuitable for combing. The former are ſo precious as to be ſought with eagerneſs, by all who wiſh to meliorate the ſtaple for the woolen manufactury in any country of *Europe;* while the latter, though much larger in ſize, are in ſo little eſtimation as never to be procured for exportation. My ſtatements and remarks will be confined to the MERINOS. The height of the male is about the ſame as that of the ordinary breed in this country. The head appears rather bigger and ſtraighter. The ears are very ſmall. The eyes remarkably bright. The horns curved in a ſpiral turn. The neck ſhort. The cheſt broad. The members more compact and thick than thoſe of our former breed of Sheep; and the carcaſe is thought to have ſmaller bones, and to be more rounded in the hinder part. The body, face and legs, are covered with a delicate fleece, which grows amazingly thick, without any mixture of coarſer locks or hairs. This fleece is remarked to be much more impregnated than that of any other breed, with an oily ſubſtance, apparently exuded in perſpiration. This animal is perfectly gentle, but quick, firm, and regular in all his movements. The female is conſidered generally as having the more characteriſtics of the pure blood, in proportion as ſhe approximates to this deſcription—yet the ewes are commonly deſtitute of horns." *

"A few well atteſted facts will ſerve to ſhew the value of this race. None of the ſuperfine cloths made in *England*, *France* and *Holland* can be fabricated without the mixture of a certain portion of this wool.—The price is more than twice as high per pound as it is for ordinary kinds. I ſhall mention, in another place, the increaſed weight of the fleece, when this breed has been transferred from *Spain* to another country, upon the teſtimony of thoſe concerned in their management. That the fleſh is not leſs ſucculent or well-flavoured than the beſt Engliſh or American mutton, I have had frequent opportunities to decide for myſelf. It is underſtood that the *Merinos* are more eaſily maintained and fattened than the taller and larger breed, inſomuch that there are perſons acquainted with both breeds who calculate that two hundred of theſe ſmall boned and ſhort legged Sheep may be kept in tolerably good condition, where twenty of the other would ſuffer for want.

"To eſtabliſh a ſtrong preſumption in favor of the ſecond point, viz. that the race then contemplated to be introduced into the U. S. was likely to preſerve all thoſe qualities which conſtituted the original ſuperiority of value, I needed only refer to the propagation of a breed from the ſame ſtock, with fleeces augmented in quantity, and undiminiſhed in fineneſs, in *Great Britain*, *France*, *Holland*, *Switzerland*, *Germany*, *Denmark* and *Sweden*. In the moſt northern climate to which they have been carried, they have ſupported the cold perfectly well, and even without ſuffering any injury from having been in ſome inſtances buried for a time under the ſnow. At the national farm of Rambouillet, in *France*, they are reported, on good authority, to have not only reſiſted the unfavourable influence of a ſituation naturally too low and moiſt, but to have preſerved their wool in all its original fineneſs, and to have increaſed the weight to an aſtoniſhing degree.

"It is a fact, confirmed by experience beyond contradiction, that the quality of the wool does not depend on the quality of the paſtures in *Spain*, becauſe the ſame paſtures have maintained, from time immemorial, two different breeds, which have never aſſimilated, one remarkable for the ſhortneſs and fineneſs, the other for the length and coarſeneſs of the wool. It is moreover equally well proved, that the quality does not depend on the journies which the greater part of the *Merinos* make annually, becauſe there are other flocks of the ſame race which remain perpetually in the ſame diſtrict, and whoſe fleeces are of the ſame conſiſtency preciſely as the others. The flocks that do travel, or do not travel, which are nouriſhed with plentiful food, and taken good care of, by excluding the deformed, ſick and weak from becoming breeders, are preſerved in all the purity of the original ſtock—while thoſe in either predicament, migrating or reſident, which are ſubjected to feel the effects of ſcarcity and negligence, invariably degenerate.

"The vigilance of the Shepherds, in remaining day and night with their charge, in reſerving the beſt formed and fineſt wooled only for breeding, and in knowing and attending to each individual of their flocks, has doubtleſs contributed much to preſerve them from degenerating down to the preſent day.

"This breed, like moſt of all others, thrives beſt in uplands and ſhort paſtures; but it is reputed to be ſo ſingularly hardy, as to endure rain, ſnow and cold as well as any northern race, and to ſupport itſelf in parched ſouthern climates, by feeding on weeds and vegetables which moſt others would not taſte. Without entering into the detail of enriching the land, on which they graze or are folded, by their manure, eſpecially where a rotation of crops is ſyſtematically purſued, I ſhould not omit to mention, it has been aſſerted, that a moderate ſized farm, for example, a hundred acres, ſkilfully manured, may be made to maintain one hundred Sheep, and moreover, to produce as much in crops as it would have done had it been employed only in cultivation, and not charged with their nouriſhment.

"That rams have been let for the ſeaſon in *England*, for from two hundred to one thouſand guineas each, is a fact ſufficiently known to thoſe who are acquainted with the hiſtory of agricultural proceedings in that country, and it demonſtrates concluſively the wonderful paſſion that prevails for bettering the breed. The ſucceſsful experiments in *France*, on the ſame ſubject, have been announced in a manner which demands credit. At *Rambouillet*, a farm originally appropriated for making improvements by the ancient Government, which is repreſented not to be a very good poſition, on account of its humidity, a pure Spaniſh flock has been maintained for many years, by the attention and care of the Superintendants, not only in a perfectly healthy, but gradually improving condition, in ſuch ſort, that the quality of the wool is as fine as that of the beſt *Merinos* actually in *Spain*, while the quantity is conſiderably more than doubled. Where large flocks are kept in the laſt mentioned country, the Sheep do not produce, upon an average, more than from two or three pounds. The rams at *Rambouillet* yield from ten to twelve, and the ewes from five to ſix each. From this ſtock, many ſmall flocks, both of the pure and mixed breeds, have deſcended.

"Several intelligent authors in Europe, who have treated of the moſt ſpeedy and efficacious modes of improving wool, have ſtated that, where the ſmallneſs of the original ſtock of *Merinos* prevents ſo rapid a propagation of the pure race as could be wiſhed, a mixed breed may be produced by Spaniſh rams, and well choſen ewes of the country, whoſe deſcendants in the fourth or fifth generation, will yield fleeces nearly or quite as fine as the firſt quality of thoſe which are produced in *Spain*."

* * *

At a meeting of the Truſtees of the Maſſachuſetts Society for Promoting Agriculture, October 29, 1802:

VOTED, that a gold medal be preſented to the Hon. DAVID HUMPHREYS Eſq. for introducing the Merino Breed of Sheep from *Spain* into this country; and that the Rev. Doct. PARKER be a committee to procure ſaid medal, and to cauſe ſuch inſcriptions to be engraven as he ſhall judge ſuitable, and to tranſmit the ſame agreeably to ſaid vote.

An extract from the minutes of the ſaid truſtees.

JOHN AVERY, *Secretary.*

ABSTRACT *of the* TREASURER's ACCOUNTS.

The Maſſachuſetts Society for Promoting Agriculture in Account with
THOMAS LINDALL WINTHROP, Treaſurer.

Dr.

1801, July.	D.	C.
To Jacob Kuhn's ſalary,	25	
To caſh paid for books purchaſed,	18	37
To caſh, premium paid,	100	
To ditto paid for 500 dolls. 6 per cent ſtock,	485	77
To caſh, premium paid,	30	
To balance due to the Society,	69	94
Dollars—	729	8

Cr.

1801, June.	D.	C.
By balance of laſt Account as reported,	62	60
By caſh for aſſeſſments,	119	
By ditto for intereſt on Society's Stocks,	547	48
Dollars—	729	8

Property in the hands of the Treaſurer.

	D.	C.
United States' 6 per cent ſtock,	3800	
United States' deferred,	1300	
Three per cent ſtock,	583	
Maſſachuſetts State Notes, 5 per cent,	1200	
United States' Bank, three ſhares,	1200	
Dollars—	8083	

The above account audited and found to be well vouched and right caſt, and the balance of *ſixtynine dollars and ninesy-four cents* due to the Society, and the evidences of the aforeſaid property in the hands of the Treaſurer.

WM. SPOONER, } *Committee.*
JOSHUA THOMAS, }

LIST OF MEMBERS

OF THE

Agricultural Society.

N. B. Thoſe who have no towns affixed to their names, belong to *Boſton.*

JOHN Adams,	*Quincy.*
Jonathan Adams,	*Northbridge.*
Joſeph Allen,	*Worceſter.*
Fiſher Ames,	*Dedham.*
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John T. Apthorp.	
John Avery.	

Thomas Babbit,	*Sturbridge.*
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Thomas Bartlett.	
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Ezra Beeman,	*Boylſton.*
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Daniel Bigelow,	*Peterſham.*
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Oliver Wendell.	
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CHOSEN JUNE, 1802.

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